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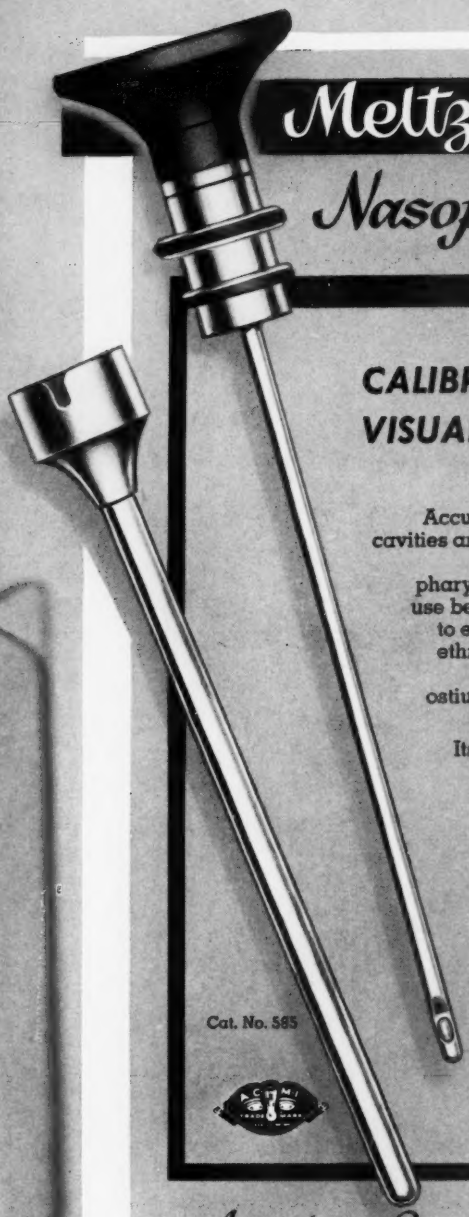

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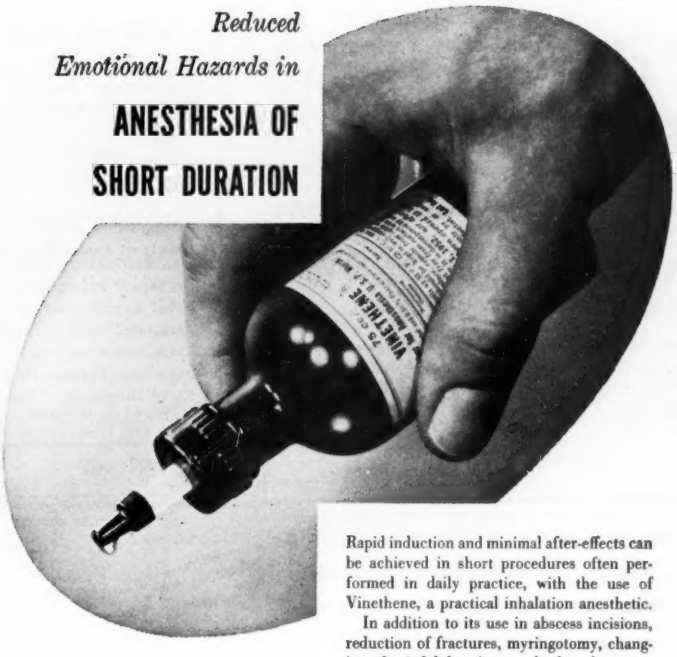

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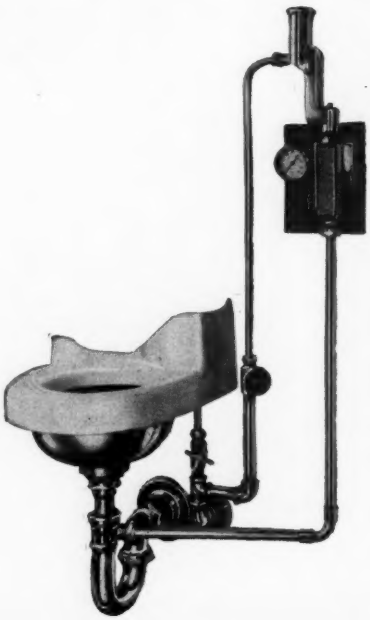

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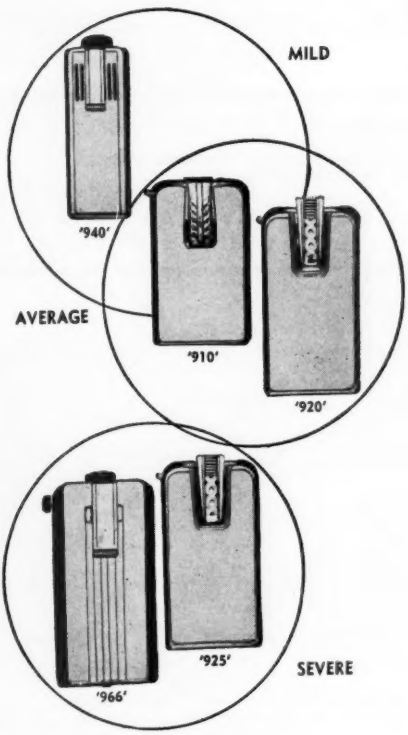

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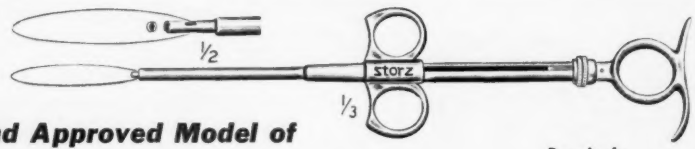

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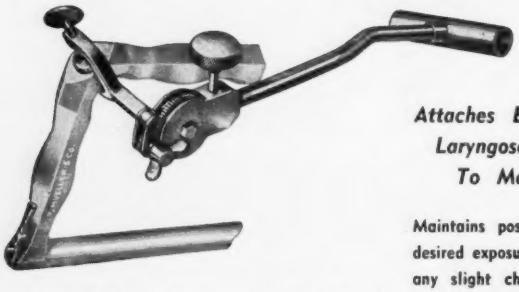

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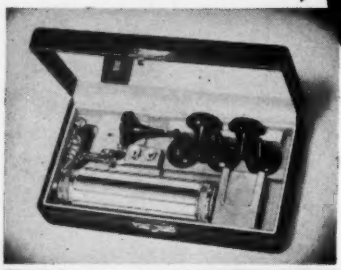

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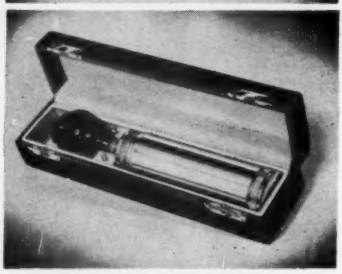

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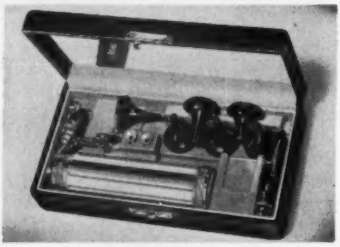

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CONTENTS

PAGE

Clinical Evaluation of Substituted Ammonium Saccharins for Nasal Medication. SAMUEL L. FOX, M.D., BALTIMORE 607

Some Experiences in Management of Cancer of Middle Ear and Mastoid. WALTER L. MATTICK, M.D., AND JOHN W. MATTICK, M.D., BUFFALO 610

Problems of the Septum in Rhinoplastic Surgery. OSCAR J. BECKER, M.D., CHICAGO 622

Tumors of the Larynx: Review of One Hundred and Sixteen Cases. HERBERT H. HARRIS, M.D., AND K. L. WATTLEWORTH, M.D., HOUSTON, TEXAS 640

Fifty Years' Progress in Scientific Otolaryngology. ALFRED LEWY, M.D., CHICAGO 646

CASE REPORTS:

Brain Abscess of Frontal Lobe Complicating Pansinusitis: Report of a Case with Operation and Recovery. BENJAMIN H. SHUSTER, M.D.; CLARENCE D. HINTON, M.D., AND ALLAN R. SHUSTER, M.D., PHILADELPHIA 655

Reconstruction of the Orbital Floor Using Stainless Steel Wire Mesh. MATTHEW S. ERSNER, M.D.; HARRY R. MORSE, M.D., AND MAURICE H. ALEXANDER, M.D., PHILADELPHIA 658

Primary Aural Cholesteatoma. B. M. VOLK, M.D., ALBANY, N. Y. 662

Exostosis of the External Auditory Canal. LIEUTENANT COLONEL BYRON G. MCKIBBEN, MEDICAL CORPS, UNITED STATES ARMY 668

Bilateral Contact Ulcer Granuloma Following Endotracheal Anesthesia. WILLIAM K. WRIGHT, M.D., HOUSTON, TEXAS 670

CLINICAL NOTES; NEW INSTRUMENTS AND TECHNIQUES:

Newly Designed Paracentesis Needle for Use in Aerotitis Media. ALBERT P. SELTZER, M.D., D.SC., PHILADELPHIA 672

Combined Palate Retractor and Tongue Protractor. HARRY NEIVERT, M.D., AND LEO A. KALLEN, M.D., NEW YORK 675

New Speculum for Use in Surgery of the Nasal Septum. HARRY NEIVERT, M.D., AND LEO A. KALLEN, M.D., NEW YORK 677

PROGRESS IN OTOLARYNGOLOGY: Summaries of the Bibliographic Material Available in the Field of Otolaryngology for 1949.

Peroral Endoscopy. LOUIS H. CLERF, M.D.; F. JOHNSON PUTNEY, M.D., AND J. J. O'KEEFE, M.D., PHILADELPHIA 679

SPECIAL REPORTS:

Hearing Aids Accepted by the Council on Physical Medicine and Rehabilitation of the American Medical Association, as of May 1, 1951 700

ABSTRACTS FROM CURRENT LITERATURE 703

CORRESPONDENCE:

The Tympanic Plexus—An Anatomic Study. SAMUEL ROSEN, M.D., NEW YORK 717

NEWS AND COMMENT 717

DIRECTORY OF OTOLARYNGOLOGIC SOCIETIES 718

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VOLUME 53 JUNE 1951 NUMBER 6

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CLINICAL EVALUATION OF SUBSTITUTED AMMONIUM SACCHARINS FOR NASAL MEDICATION

SAMUEL L. FOX, M.D.
BALTIMORE

HAMILTON and Turnbull,[1] noting the similarity of the chemical structures of saccharin and sulfanilamide, prepared a group of substituted ammonium saccharins for the purpose of evaluating them as nasal medications. As many as 41 different amine saccharinates were prepared by them and tested bacteriologically on agar plates and in tube cultures. They found that saccharin salts of alkyl amines with three or more carbon atoms in the hydrocarbon chain were strong inhibitors of Staphylococcus aureus. They also found that at a concentration of 0.001 per cent laurylammonium saccharin was bactericidal to streptococci of the viridans group and to hemolytic streptococci. A combination of desoxyephedrine saccharinate with laurylammonium saccharin (1:25) was also bactericidal to Pseudomonas aeruginosa (Bacillus pyocyaneus) strains, Bacillus coli and Friedländer's bacillus. these being pathogens which are common in nasal secretions.

After having tried 32 different mixtures, Hamilton and Turnbull [1] adopted the following formula as the most effective for nasal medication: desoxyephedrine saccharinate 0.5 per cent weight per volume and laurylammonium saccharin 0.02 per cent weight per volume in a 0.9 per cent sodium chloride solution buffeted to pH 6.5 by the addition of mixed sodium biphosphate and disodium phosphate 0.1 per cent. The desoxyephedrine compound is the vasoconstrictor agent, while the laurylammonium saccharin is the bactericide in the preparation. The finished solution is said to be nearly clear, water white, stable to light and heat and able to withstand autoclaving with no apparent loss in its potency. The mixture seems to be self sterilizing according to the results of repeated bacteriological testing.[1] Tests of ciliary motility were carried out by Strickland [2] on excised rabbit tracheal rings. and it was shown that the medicament had little effect on the cilia.

Animal studies to determine the toxicity and pressor effects of the preparation were carried out by Molomut and Haber.[3] The acute toxicity of the amine saccharinate is reported to be identical with that reported for *d*-desoxyephedrine by

From the Department of Otolaryngology of the University of Maryland School of Medicine and College of Physicians and Surgeons and the South Baltimore General Hospital.

1. Hamilton, W. F., and Turnbull, F. M.: Substituted Ammonium Saccharins for Nasal Medication, J. Am. Pharm. A. (Scient. Ed.) **39**:378 (July) 1950.

2. Strickland, A. G. R., cited by Hamilton and Turnbull.[1]

3. Molomut, N., and Haber, A.: The Toxicity and Pressor Effect of an Amine Saccharinate as a Nasal Decongestant, New York Physician **34**:3 (April) 1950.

other investigators.[4] Daily medication in single doses 150 to 200 times greater than the dose which is advised for an average 50 Kg. human revealed no gross or microscopic toxic effects when given to guinea pigs intranasally or subcutaneously and orally to rats.

The pressor effect was studied by the usual cannulated carotid artery preparations in cats, and the medicament was studied both by intranasal application of drops and by the intravenous administration of the amine saccharinate mixture.[3] The intravenous application of the preparation (containing 5 mg. of desoxyephedrine saccharinate per dose) did not alter the blood pressure or respiratory rate. The intravenous administration of 0.1 mg. of desoxyephedrine saccharinate per dose resulted in an average blood pressure rise of only 6 per cent, whereas comparable injections of phenylephrine hydrochloride (neo-synephrine hydrochloride®) resulted in an average blood pressure rise of 38 per cent.

The mixture apparently meets the present day accepted standards for rational nasal medication, as outlined by Fabricant [5] and others: 1. It is an isotonic solution. 2. It has a slightly acid reaction (pH 6.5). 3. It is a buffered solution. 4. It exhibits no interference with ciliary activity. 5. It produces rapid and effective vasoconstriction without undue "rebound" action. 6. It exhibits no local or systemic toxicity in the usual dose.

CLINICAL STUDIES

I undertook a clinical evaluation of the effect of the mixture [6] on a selected group of 355 patients in the spring of 1949. Of this number, 196 were considered to be suffering from infectious rhinitis and sinusitis and 159 from allergic rhinitis. In this series of 355 patients, 207 were adults, 134 were children (ages 2 to 12 years inclusive) and 14 were infants. Blood pressure readings were recorded for all the adult patients, with the following findings: There were 183 considered to have a normal blood pressure (systolic under 150 and diastolic not over 90); there were 19 considered hypertensive by the same standards, and there were five considered hypotensive (systolic 100 or below and diastolic below 70). For 250 of the patients in the study, medication was limited to daily treatments in the office or clinic, and for 105 of them these office or clinic treatments were supplemented by the use of the preparation at home between office or clinic visits. All patients were seen daily, and the average duration of treatment was 12 days. (Since this original series was completed, more than 300 additional patients have been treated with this mixture and the results have been similar.)

Patients were treated by atomizer spray in the clinic and office and this treatment was repeated two or three times in a period of approximately 10 minutes. For home use, the preparation was prescribed as a nose drop (5 drops every four hours) for the infants and young children and as an atomizer spray (every four hours) for the older children and adults. Blood pressure readings were taken at the beginning and completion of each office or clinic visit, and no demonstrable change was noted in any patient in the study either immediately after treatment or during the course of the treatments.

In every patient tested, the mixture produced a rapid and distinct shrinkage of the nasal tissues without undue blanching of the nasal mucosa, and the degree and duration of vasoconstriction compared favorably with that produced by 0.25 per

4. Haley, T. J.: Desoxyephedrine: Review of the Literature, J. Am. Pharm. A. (Scient. Ed.) **36**:161 (June) 1947.

5. Fabricant, N. D.: Nasal Medication: A Practical Guide, Baltimore, Williams & Wilkins Company, 1942.

6. The Doho Chemical Corporation, New York, supplied this mixture, now marketed under the name rhinalgan,® for clinical trial.

cent phenylephrine hydrochloride solution and 1 per cent ephedrine sulfate solution. (This comparison of the vasoconstrictor effects was determined in approximately one-half the cases by the application of the mixture to one side of the nose and of one of the above solutions to the other side of the nose.)

The patients with infectious rhinitis showed greater vasoconstrictor effect than did the patients with allergic rhinitis. The vasoconstrictor effect of the mixture usually was manifest in three to four minutes and maximal in approximately 10 minutes. The duration of vasoconstriction varied from one to four hours, depending upon the degree of congestion present. This compared favorably with the other preparations used. There was no undue rebound action (after-swelling), either subjectively or objectively. No bacteriological studies were made of the nasal flora in this investigation.

Subjectively, the preparation was well tolerated. The commonest complaint from the adult patients concerned the excessively sweet taste when the drops or spray entered the pharynx, but this taste was not of sufficient seriousness to cause any patient to discontinue medication. There were no undesirable reactions or side effects complained of or noted. There was no visible irritation of the nasal mucosa, and no instance of allergic reaction was observed in either children or adults in this series. Many patients volunteered the information that the use of the preparation was followed by a mild sense of anesthesia in the nose and this was especially welcome to the patients with allergic rhinitis.

The product proved particularly popular with young children, who objected to the bitter taste of the other nasal preparations but readily accepted the sweet taste of this mixture. No central nervous system effects (nervousness, restlessness, sleeplessness) were noted in any case.

SUMMARY

A brief review of the chemistry, bacteriology and pharmacology of a new vasoconstrictor, consisting of desoxyephedrine saccharinate and laurylammonium saccharin in a buffered isotonic aqueous solution, is presented along with the results of a critical investigation of its use on 355 patients.

The mixture appears to meet the present day accepted standards for local nasal preparations and is apparently nontoxic, causing no demonstrable increase in blood pressure in any instance in which it was used.

1205 St. Paul Street (2).

SOME EXPERIENCES IN MANAGEMENT OF CANCER OF MIDDLE EAR AND MASTOID

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THIS communication will record the experience at this institute in the management of tumors of the middle ear and mastoid which have been seen in a rather extensive cancer service. Since the inception of this clinic approximately 70,000 patients have been referred here, of which number about 50 per cent are found to have tumor, mostly of a malignant category, with only 10 cases in which the tumorous lesion involved the middle ear or mastoid.

In general, tumors of the ear are classified into three categories: (1) extrinsic—those occurring on the auricle, concha or external canal; (2) intrinsic—those occurring in the tympanic cavity, tympanic membrane or mastoid, and (3) indeterminate—those for which it is impossible, owing to the advanced stage of the lesion, to ascribe a possible origin in either of the two former regions. Of the 10 cases to be reported here, all were presumably cases of cancers of intrinsic origin, except two, which were in the indeterminate group or of dubious origin. Extrinsic lesions, i. e., those of the external canal, concha, pinna, etc., while much more numerous (approximately 632 cases), will not be considered here, as in this clinic they are treated by the dermatologist (and plastic surgeon) and are mostly basal cell and squamous cell lesions of the skin of the ear. However, in passing, note should be taken that this category makes up approximately 98.5 per cent of the cancers about the ear as compared with 1.5 per cent (10 cases of middle ear and mastoid tumor) of intrinsic origin.

The relative incidence of intrinsic ear cancer is very low in any otologic service. A fair estimate of its prevalence as gleaned from the literature can be obtained from a recent report, from Jefferson Hospital, Philadelphia, by Towson and Shofstall,[1] in which these authors noted three instances of intrinsic ear cancer in 1,883 patients admitted in 1947 and 1948 (0.0016 per cent), and, likewise, Figi and Hempstead,[2] from the Mayo clinic, over a six year period recorded an incidence of 0.003 per cent. Broders,[3] from the same clinic, reporting on an earlier

From the Roswell Park Memorial Institute, Louis C. Kress, M.D., Director.

1. Towson, C. E., and Shofstall, W. H.: Carcinoma of the Ear, Arch. Otolaryng. **51**: 724-738 (May) 1950.

2. Figi, F. A., and Hempstead, B. E.: Malignant Tumors of the Middle Ear and Mastoid Process, Tr. Am. Acad. Ophth. **47**:210-229 (Jan.-Feb.) 1943; Arch. Otolaryng. **37**:149-168 (Feb.) 1943.

3. Broders, A. C.: Epithelioma of the Ear: A Study of 63 Cases, S. Clin. North America **1**: 1401-1410, 1921.

series of 63 cases of ear cancer, estimated 84 per cent of the ear cancers occurred in the auricle, 12 per cent in the external auditory meatus and only 1.5 per cent in the middle ear and mastoid. The last figure, of 1.5 per cent, coincidentally, represents the approximate frequency of middle ear and mastoid cancer as observed in our clinic. In general hospital and clinic experience, the occurrence of intrinsic ear cancer has variously been stated as 1 in 5,000 to 1 in 20,000. At our tumor clinic, the incidence has run approximately 1 in 7,000.

Intrinsic ear carcinoma, like cancer in general, is of enigmatic origin but, like these lesions in general, is most commonly ascribed to chronic irritation and thought in many cases to be initiated by the persistent and prolonged otorrhea of chronic purulent otitis media and mastoid involvement. Like cancer in general it is generally a disease of middle or later adult life (table). Thus in six of 10 of our cases the cancer occurred in or after the fourth decade of life and, incidentally in eight of 10 intrinsic ear cancers in females. All the patients were of the white race except one.

In our series of 10 cases, there was a history of previous long-continued otorrhea in seven, while in the remaining three cases there was no such history. However, as will be noted later, two of this number have recently been reclassified by us, and the cancers may, therefore, be expected to have a different cause than the ordinary squamous cell carcinoma.

The histopathology in most of our cases was that of the usual squamous cell epithelioma, often with pearl formation. This was the common finding in all but two of our cases and is in accordance with the more usual type of tumor in this region as noted by all writers, including Rosenwasser,[4] Schall,[5] Figi and Hempstead,[2] Grossman, Donnelly and Snitman[6] and others. We had no incidence of fibrosarcoma, whereas it was noted by Figi and Hempstead,[2] or of adenocarcinoma, which was reported by Furstenberg,[7] Grabscheid,[8] Schall,[5] Fraser[9] and Thorell.[10] One of our two exceptional cases had been classified by the Army Tumor Registry of Otolaryngology and by our laboratory as an instance of "angioendothelioma." This tumor has apparently been observed rather often in the middle ear and mastoid, even as far back as 1906 by Joseph Beck[11] and again in 1907 by Bryant.[12] Figi and Hempstead[2] recorded seven instances of angioendothelioma in their

4. Rosenwasser, H.: Neoplasms Involving Middle Ear, Arch. Otolaryng. **32**:38-53 (July) 1940.

5. Schall, L. A.: Neoplasms Involving the Middle Ear, Arch. Otolaryng. **22**:548-553 (Nov.) 1935.

6. Grossman, A. A.; Donnelly, W. A., and Snitman, M. F.: Carcinoma of the Middle Ear and Mastoid Process, Ann. Otol. Rhin. & Laryng. **56**:709-721 (Sept.) 1947.

7. Furstenberg, A. C.: Primary Adenocarcinoma of the Middle Ear and Mastoid, Ann. Otol. Rhin. & Laryng. **33**:677-689 (Sept.) 1924.

8. Grabscheid, E.: Adenocarcinoma Involving the Middle Ear, Arch. Otolaryng. **37**:430-433 (March) 1943.

9. Fraser, J. S.: Malignant Disease of the External Acoustic Meatus and Middle Ear, Proc. Roy. Soc. Med. (Sect. Otol.) **23**:71-77 (June) 1930.

10. Thorell, I.: Treatment of Malignant Tumors of Middle Ear at Radiumhemmet, Stockholm, Acta radiol. **16**:242-253, 1935.

11. Beck, J. C.: Angio-Endothelioma of the Middle Ear: Report of Case, Illinois M. J. **9**:137-140, 1906.

12. Bryant, W. S.: A Case of Carcinoma of the Middle Ear, Probably Endothelioma, Ann. Otol. Rhin. & Laryng. **16**:301-312, 1907.

report on a series of 38 cases of malignant tumors of the middle ear and mastoid. The other case in our series had been classified on microscopic section as a case of xanthomatous polyp. However, more recently, with the concurrence of T. Winship,[13] we are revising the diagnosis in these two cases to glomus jugulare tumors. We expect that many other cases previously diagnosed as angioendothelioma may be similarly revised. A more detailed report of these two cases and revised opinions of this lesion will be considered in a forthcoming communication. Another case was controversial as to whether the tumor originated in the middle ear or in the parotid gland with secondary invasion of the external ear canal and middle ear.

All 10 cases herein cited were proved by microscopic section, by biopsy, and/or autopsy. Here it is timely to mention the admonition of earlier writers, i. e., that biopsy be done on all growths suspected of being cancerous or polypoid growths of the deep ear canal, as such examination is often the earliest and surest means of making the diagnosis of cancer in the ear.

The history, as given by our patients, was generally that of hearing loss, with otorrhea of long standing or, less commonly, of more recent onset in an adult and often accompanied with pain and bloody discharge. In this series the following incidence of early symptoms and signs was noted: 1. Otorrhea, often of long duration and frequently with blood-tinged discharge, was noted in seven cases. 2. Hearing loss, unilateral, of the conductive type, with lateralization of the tuning fork to the ipsilateral side and a negative Rinne response on the same side, was noted in all cases as an early symptom. 3. Granulating or polypoid growth in the affected ear canal usually was an early finding and occurred in all our patients at some time in the course of the disease. 4. Pain occurred in all our patients with ear cancer of squamous cell origin at some time in the course of the disease. 5. Facial paralysis of the peripheral type was often noted, generally later in the course. It occurred in six of our patients. 6. Vertigo was seldom noted except in the advanced stages of the disease. 7. Neck node metastasis occurred later and was noted in four of our patients. 8. Other cranial nerve involvement was noted only in the more advanced cases and in the late stage of the disease. Thus the seventh, eighth, ninth, tenth, eleventh and twelfth nerves may be involved at or near their foramens; also, the third, fourth, fifth and sixth, and even a Horner syndrome, by extension through the petrous bone and deep metastatic involvement, have been reported.

Diagnosis was most quickly arrived at through the history of hearing loss, otorrhea, pain and bleeding from the ear canal, from which a biopsy of presenting granular or polypoid tumor could generally be made. However, in a few cases suspected of cancer, when the drum membrane is thickened repeated myringotomy may be necessary, as in one of our cases.

Roentgenograms of the mastoid and petrous bone were not as generally helpful in early diagnosis as might be expected. Their chief use seemed to be in recording the progress of the disease. The principal findings in our roentgenograms of the mastoid were reported as cloudiness and poor aeration on the affected side in five, sclerosis in four, poor cell outline in three and coalescence or destruction of bone structure in one of the patients.

13. Winship, T.; Klopp, C. T., and Jenkins, W. H.: Glomus-Jugularis Tumors, Cancer **1**: 441-448 (Sept.) 1948.

The management of our patients conformed generally to that enunciated by Furstenberg,[7] Schall,[5] Smith,[14] Thorell,[10] Figi and Hempstead,[3] Morrison,[15] Grossman, Donnelly and Snitman[6] and others and consisted in (1) surgical ablation, i. e., radical mastoidectomy with or without electrocoagulation, (2) radium installation in the middle ear, mastoid and/or external canal, followed by (3) external high voltage x-ray therapy to the affected ear and mastoid.

After surgical ablation, intracavitary gamma irradiation was the method of choice until the surgical wound was nearly healed. This varied in these cases from 200 millicurie hours in 0.3 mm. of gold applied in the mastoid cavity in our first cases to 540 milligram hours of radium in 0.6 mm. of platinum in case 5. In case 3, in which the patient had been under observation since 1943 and steadfastly refused operation, a beta ray applicator had been applied against the tumor in the external canal with only temporary or slight regression.

X-ray therapy was applied later, externally, to the ear and mastoid region with 200 kv. In case 8, the 4 Gm. radium pack was used, and in four cases 400 kv. x-ray therapy was applied to full skin tolerance. Electrocoagulation was used in conjunction with surgery in two cases.

The prognosis of middle ear and mastoid cancer generally has been cited as very poor, especially in the squamous cell variety. Our experience seems to have been more fortunate in that we have had two patients with proved squamous cell epitheliomas, primary in the middle ear and mastoid, who have survived free of all evidence of disease for five or more years. One patient with middle ear and mastoid cancer, treated in 1935, is still alive and free of disease, and the other, treated in 1943, remained free of disease, only to succumb to pneumonia at the age of 84. Of the two patients referred to above with diagnosis revised to glomus jugulare tumors, one is alive, well and free of recurrence since operation for over five years, and the other, who still refuses operation, is still well and comfortable but with apparent tumor in spite of our admonitions.

In the table are depicted salient features of these 10 cases, together with abstracted reports of the therapy and results. A brief history of the two patients with arrested squamous cell lesions and the two other living patients who have or have had the controversial glomus tumors will be given in more detail.

REPORT OF CASES

CASE 1.—An unmarried white woman, aged 35, a houseworker, was admitted to this clinic on Oct. 30, 1939. One of her sisters had died of cancer of the breast, but otherwise the family history provided no information of importance. At the age of 8 years the patient had scarlet fever, and at that time an abscess of the right ear was opened; thereafter she had a chronic purulent drainage and deafness of both ears, worse in the right ear. The rest of the past history is irrelevant. Of late, the patient has had increased pain and purulent discharges, occasionally bloody, from the right ear canal, and she has been unable to sleep on the right side because of the pain in the ear. Paralysis of the right side of the face developed recently, and radical mastoidectomy on that side was done at a local hospital; at this operation suspicious-appearing tissue was found in the middle ear, and this was diagnosed by our pathology department as squamous cell epithelioma of the mucous membrane type. The patient was then referred to this institute for further treatment.

14. Smith, C. H.: Primary Carcinoma of Middle Ear and Mastoid: Endaural Approach to the Mastoid, Laryngoscope **50**:547-554 (June) 1940.

15. Morrison, L. E.: Cancer of the Middle Ear: Report of 4 Cases, J. Indiana M. A. **39**: 167-170 (April) 1946.

Case	Race	Age	Sex	Date of Admission	Origin*	Chief Symptoms	Pathology	Therapy	Results
1	W	35	F	10/30/35	I	Otorrhea and hearing loss, 27 yr.	Squamous cell ca. at operation (fig. 1)	Radical mastoidectomy 8/27/35; radium and 200 kv. x-ray	N.E.D. 15 yr.
2	W	17	F	4/1/42	I	Hearing loss in left ear; later, tumor in left ear drum	Angioendothelioma; biopsy, 1945; changed to glomus jugulare tumor 1949 (fig. 2)	Radium in ear canal; radical mastoidectomy; radium and 200 kv. x-ray	Regression; pregnancy; recurrence 2/1/45, N.E.D.
3	W	57	F	11/2/42	I	Hearing loss, bleeding in left ear, 1930; later, tumor in left ear canal, 1942	Xanthomatous polyp; biopsy, 1942; changed to glomus jugulare tumor in 1949	Beta bomb to left ear canal; refused surgery	Comfortable; tumor present
4	N	41	F	5/26/43	?E	Itchy ear canal; pain; hearing loss; otorrhea, bleeding in left ear; metastatic neck nodes	Squamous cell carcinoma; biopsy	Electrocoagulation of canal; 200 kv. x-ray; mastoidectomy, radium and 400 kv. x-ray	Temporary regression; 7th nerve paralysis and cervical node metastasis; D.D. 5/5/44
5	W	78	F	11/17/43	I	Hearing loss, otorrhea; 2 yr.; later foul and bloody discharge and pain in left ear	Squamous cell ca., prickle cell type; biopsy (fig. 3)	Radical mastoidectomy 12/4/43; radium and 200 kv. x-ray	N.E.D. seven yr.; D.O.C. 1949
6	W	36	M	6/16/33 9/25/44	?E	Tumor right parotid 6/16/33; at next admission had pain, bloody otorrhea, and hearing loss in left ear; sinus under ear canal and neck nodes	Plugged salivary duct 6/16/33; squamous cell ca., prickle cell type 1944; biopsy of sinus tract	Radium to left parotid 1933; 200 kv. x-ray to left ear; radical mastoidectomy; radium and 400 kv. x-ray	D.D. 5/10/45
7	W	67	F	4/12/46	I	Hearing loss and bloody otorrhea 4½ yr.; myringotomy 1941; x-ray therapy to right ear elsewhere; admitted in coma with 7th nerve paralysis and meningitis; tumor in ear canal	Squamous cell ca.; biopsy (fig. 4)	Moribund, not treated	D.D. 4/16/46; autopsy, temporosphenoidal lobe extension
8	W	53	F	5/22/46	I	Otorrhea in left ear for 43 yr.; pain; tumor; 7th, 9th, 10th, 11th, 12th nerve paralysis; radical mastoidectomy 12/17/45 elsewhere; apparently hopeless on admission	Squamous cell ca.; anaplastic; biopsy	Radium pack; 400 kv. x-ray	Healing of canal; drove ear again; recurrence; D.D. 6/14/47
9	W	53	M	2/21/47	I	Otorrhea and hearing loss following left mastoidectomy, 1917; sudden cessation of discharge lately; fistula superior deep canal; metastatic mass left neck, 4 mo.	Squamous cell ca. from metastatic node 2/21/47; aural polyp, left ear canal, 3/7/47	400 kv. to ear and nodes	Temporary regression; D.D. at V.A. Hosp. 3/9/48
10	W	25	F	9/8/47	I	Hearing loss Feb. 1946; thickening of right ear drum; myringotomy twice; node in right upper cervical region biopsied; carcinoma; x-ray therapy given; no discharge; posterior tympanic membrane thickened; later granulations in canal	Squamous cell ca. from neck node in Arizona; squamous cell ca. III; biopsy right ear canal, 2/6/48	Radical right mastoidectomy, 5/20/48; radium in cavity; 400 kv. x-ray to right mastoid	Palliation; then symptoms of brain tumor; D.D. 12/13/48; autopsy, ca. extension to midfossa and brain

* Key to abbreviations: I, intrinsic; E, extrinsic; N.E.D., no evidence of disease; D.D., died of the original disease, D.O.C., died of other causes but free from original disease.

Physical examination disclosed a fairly well nourished white woman of middle age, markedly deaf, with a serosanguineous discharge from the right ear canal and a slight seropurulent discharge from the left. There was facial paralysis on the right side and a healing postaural incision from the previous radical mastoidectomy on that side. The right ear canal was blocked with fungating tumor tissue. The left tympanic membrane showed a perforation in its posterior half and a slight seropurulent discharge. There was considerable pain in the right ear and temporal region but none on the left side. There were no palpable lymph nodes. The rest of the physical examination provided no information of significance. The Wassermann reaction was negative.

Roentgenograms of the mastoids showed the bone to be sclerotic in both sides. No cells could be visualized on the right side, which had been operated on, and only a few on the left.

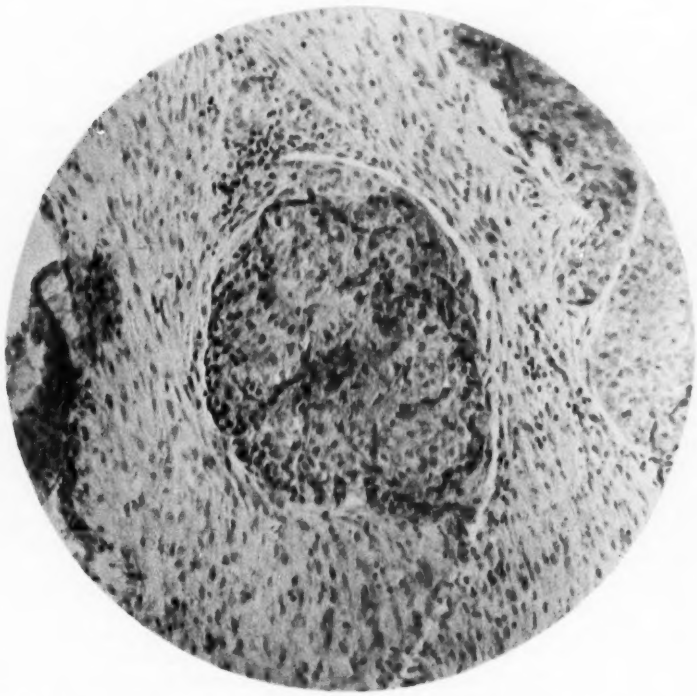

Fig. 1 (case 1).—Section of tissue taken from middle ear during radical mastoidectomy and diagnosed as squamous cell epithelioma.

Treatment with 200 kv. x-rays, 0.9 mm. Cu half-value layer, was begun on November 4. Treatments were given daily except Sunday over the right ear and mastoid through an 8 by 10 cm. portal at 50 cm. skin-target distance for a dose of 280 r. Seven treatments were given. On Jan. 3, 1940, there was less discharge and pain from the right ear but fungations were still visible. These were removed, and a radon gold applicator of 0.3 mm. wall thickness improvised for installation into the right middle ear and mastoid cavity was inserted and left in place for a total dose of 200 millicurie hours.

On January 27 the fungations were less marked and the discharge less sanguinous. By February 28 the right ear canal had healed and was dry but scarred. There was no change in the facial paralysis or in the hearing on the right side. The pain had ceased, and the postaural incision remained healed. There were no palpable cervical nodes. The patient continued to have slight seropurulent drainage from the left ear canal.

When last seen, on Oct. 5, 1949, the patient was still markedly deaf, worse in the right ear. The right ear canal was dry and well epithelized over; there were no signs of recurrence. The right mastoid scar was well healed; there was no pain and no palpable nodes, but the facial paralysis on the right and the chronic seropurulent otitis media of the left ear still persisted.

CASE 2.—An unmarried white female student, aged 17, was admitted on April 1, 1942. Her family history was not remarkable, and her past history, generally noncontributory.

In the fall of 1941, during a routine school examination, partial deafness was found in the patient's left ear. She went to a specialist who noted a growth in the left ear canal and removed a section, which was referred to our pathology department and reported as showing a general inflammatory picture with strands of questionably malignant epithelial cells in a fibrous connective tissue matrix in some areas. There was no history of previous pain or discharge from the ears. She was referred to our clinic for further treatment.

Physical examination showed a white girl, well nourished and developed, 17 years of age. The results of the examination were not remarkable except for findings in the left ear canal, where a mammillated appearance of the integumental covering of the posterior superior portion of the left ear canal and adjoining tympanic membrane was noted. Tuning fork tests showed lateralization to the left and a slightly prolonged bone conduction on this side. There was a moderate deafness to ordinary conversation in this ear. Examination of the nasopharynx showed some persistent adenoid tissue in the vault. Another section, taken from the growth in the right ear canal, showed "papilloma." The blood Wassermann reaction was negative. There were no adenopathies.

Roentgenograms of the mastoid and petrous regions showed good aeration of the cells, with no evidence of osteolytic or hypertrophic bony changes.

The patient was hospitalized from May 2 to May 3 for insertion of a specially constructed radium tube containing 5 mg. of radium filtered by a wall thickness of 0.6 mm. of platinum. The patient had an equivalent of a total of 15 hours or 75 milligram hours in the left ear canal deep against the drum membrane. Just before the radium was inserted, another section was taken from the growth with use of topical cocaine anesthesia and again reported as papilloma.

By June 10 there was considerable shrinkage of the tumor on the posterior superior external canal and drum membrane region of the left ear, and there were no cervical nodes. A roentgenogram of the mastoids showed slightly less aeration of the cells on the left side but otherwise was negative for any bony changes.

On November 27 considerable telangiectasia as a result of the radium application was noted on the left deep posterior ear canal and half of the drum membrane.

In July 1943 the left ear drum was quite easily visualized, and the long process of the malleus was clearly defined, but the posterior portion of the drum membrane and the adjoining ear canal wall were reddened and thickened. There was no evidence of tumor at this time. There was still considerable deafness in this ear. The patient lateralized the sound of the tuning fork, and there was a negative Rinne response on this side. The patient had finished high school and was working daily. A year later, July 1944, the posterior inferior quadrant of the left drum membrane and the skin of the adjoining ear canal were still slightly red and scarred. The patient was working daily and had considerable hearing in the left ear. There was no discharge, pain or adenopathies.

The patient failed to return again until Oct. 1, 1945, when she reappeared with the history of having married since her last visit and of having given birth to a normal boy. During this pregnancy, left facial paralysis developed, coming on insidiously and involving the left eyelids, cheek and corner of the mouth. The left ear canal was dry. There was no pain or tenderness over the mastoid, but there was a recurrent sessile tumor mass covered by reddened integument, which was apparently attached to the inferior posterior portion of the drum and extended over on the

adjoining posterior deep ear canal. The vessels on the surface of this mass were dilated, and the mass had almost occluded a view of the drum membrane, which had been well visualized on the last visit. There were no adenopathies. Roentgenograms of the mastoids showed increased density and decreased aeration of the left mastoid region but no evident osteolytic bone changes. A roentgenogram of the chest also revealed nothing remarkable. With the area under topical cocaine anesthesia, the tumor mass in the left ear canal was aspirated on the assumption that it was angiomatous or cystic, and 1 cc. of bloody fluid of no diagnostic importance was obtained.

A radical mastoidectomy was advised and done November 29, with the patient under ether anesthesia, through a postaural incision over the left mastoid. The antrum was opened, cells exenterated and the bridge and posterior bony canal wall taken down, with exposure of the

Fig. 2 (case 2).—Section of tumor removed during radical mastoidectomy. The histopathological diagnosis given was angioendothelioma.

middle ear cavity. The drum, malleus and incus were removed and the tumor mass noted to arise from the posterior internal surface of the annulus tympanicus and adjoining middle ear cavity and apparently to have eroded into the adjoining posterior bony external ear canal wall. The tumor was shelled out readily. A Panse flap from the posterior ear canal was sutured to the periosteum underlying the temporal muscle and the cavity packed with iodoform gauze brought out through the external ear canal. The postaural incision was closed with interrupted dermal sutures. The histopathological diagnosis of the tumor removed was given as angiofibroma from our laboratory, and hemangioendothelioma was the diagnosis given from the same tissue from the Otolaryngologic Registry of the United States Army.

The postoperative course was uneventful. The left facial paralysis was unimproved, and the left ear canal was healed and dry. On Jan. 16, 1946, a radium element tube was constructed for fractional treatment in the left deep ear canal and tympanum. From this date until January 21, 10 mg. of radium element in a 1 mm. gold jacket was left in place for a total of 250 milligram-hours. By February 23, there had been no recurrence of the tumor and the ear canal was dry, but the facial paralysis had not improved. The patient was referred for 200 kv., 0.9 mm. cu. half-value layer to the left ear and mastoid region to complete the therapy. She received 8 by 400 r or 2,800 r to this region from the above date until March 5.

Examinations since that date show no recurrence of the tumor or of the nodes. She was advised to consider facial nerve repair, but after she had procrastinated for a year or more, she was told that such procedure would be less advisable than attempts at fascial implants for correcting the facial expression. She remains well to date.

Comment.—Having noted reports on carotid body type tumors of the mastoid and glomus jugulare tumors of this region as cited by Rosenwasser,[4] Lattis and Waltner and Winship [18] and also having noted that many of these tumors were previously diagnosed as angioendotheliomas, we have reviewed our original sections and revised the diagnosis to glomus jugulare tumor. Winship [18] has concurred with such revision. This change also is in greater conformity with the history and findings in this and a later case.

Case 3.—A 57 year old biparous housewife was admitted to the hospital on Nov. 2, 1942. Her family history was not remarkable. She had broken her wrist in 1937. In 1930 she noted pounding in her left ear, and there was a bloody discharge; the ear was lanced. For the last 30 years there has been loss of hearing in the left ear. In the spring of 1942 she had noted a growth, described as a polyp, in her left ear; it bled profusely. From a section taken by the referring specialist, a diagnosis of "xanthomatous polyp" was made here. Before admission to this hospital, she had had four x-ray treatments to the left ear.

Physical examination showed a well nourished middle-aged woman, edentulous and wearing plates. The heart and lungs were normal, and the liver and spleen were not palpable. The cervix was lacerated, but the pelvis otherwise was not remarkable. The breasts were normal. There were varicose veins in both legs. The reflexes were normal, and the Wassermann reaction of the blood was negative.

A tumor obstructing the ear canal was noted in the left ear; it appeared soft and cystic and pulsated. The skin over it was intact. The drum membrane could not be visualized. On the tuning fork test the patient lateralized the sound to the left, and the Rinne test was negative; she was moderately hard of hearing on this side.

Roentgenograms of the mastoids showed the left to be slightly cloudier than the right but nothing else of significance. Submentovertex roentgenograms generally showed no abnormalities.

Since the patient refused operation, a radon bomb was applied to the left ear canal every second day for three treatments, 4 millicurie hours being given at a treatment, the total dose was thus 12 millicurie hours, a very generous skin dose.

By December 10 the mass in the left ear canal was smaller. Aspiration of the mass yielded blood but the ear was otherwise dry. After that, the patient was ambulatory, felt well and steadfastly maintained that her ear did not trouble her and that she did not want an operation.

Roentgenograms at least twice yearly showed cloudiness of the left mastoid, with poor cell definition; otherwise they revealed nothing remarkable. The patient was seen approximately every six months. The tumor in the left ear canal was getting slightly larger but otherwise giving no more inconvenience. The patient still refused operation.

On Oct. 19, 1949, the patient had an earache and some trismus, and the ear commenced to discharge. This relieved some pain. There was no mastoid tenderness and the roentgenograms of the mastoid revealed nothing remarkable. The tumor mass appeared red, and pulsated, discharging some pus and blood. Biopsy at this time was reported as indicating ulcer. Silver nitrate was applied to the ulcerous area, after which the discharge of pus and blood ceased and the area epithelized over.

On April 5, 1950, the left ear canal displayed a larger pulsating skin-covered tumor which obstructed the left external ear canal. The patient still lateralized the tuning fork to the left, with a Rinne negative test. The ear canal was dry, and there was no pain. Roentgenograms of the mastoid revealed findings as before. The patient insisted she felt well and wanted no operative intervention.

Comment.—On a recent review of the microscopic sections, the diagnosis has been revised, in light of our better knowledge, from xanthomatous polyp to glomus jugulare tumor. This revision has been confirmed by Winship.[13]

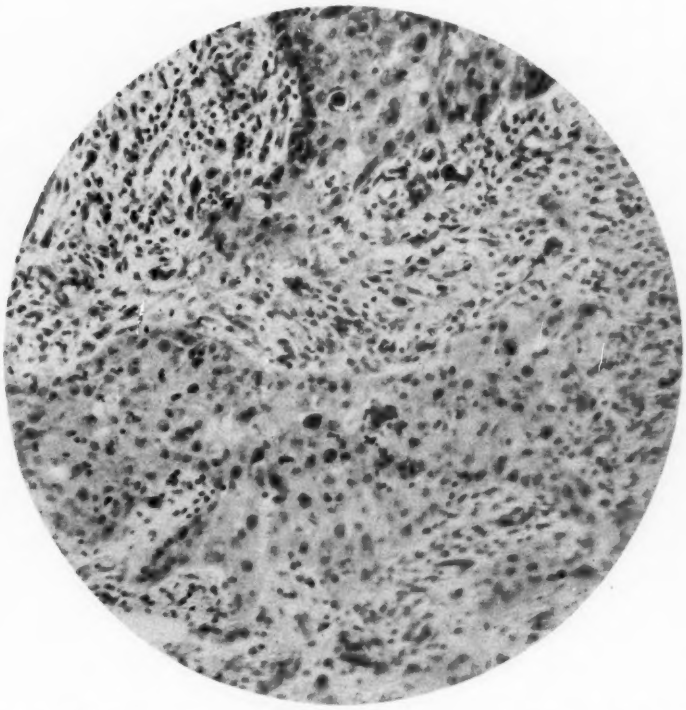

Fig. 3 (case 5).—Tumor tissue biopsy, diagnosed as squamous cell carcinoma, prickle cell type.

CASE 5.—A white, widowed housewife, aged 78, was admitted to the clinic Nov. 17, 1943. Her family history was not remarkable. The patient who was a tripara had had pneumonia 30 years ago. She had had a mastectomy in 1915 for carcinoma of the left breast. A papillomatous tumor, which was suspected of malignant change, was removed from the tongue in 1935.

Since 1941 the patient had had a watery discharge from the left ear canal. She consulted a physician in Chicago, who gave her a white powder to use and advised leaving the ear alone on account of her age. She consulted an ear, nose and throat specialist in Rochester, N. Y., who removed a biopsy specimen from the tissue presenting in the fundus of the left ear canal. The specimen was sent to our laboratory, where it was diagnosed as pearl cell epithelioma. The patient was referred to this clinic for further treatment.

Physical examination revealed a white woman of 78 years with the left breast removed but otherwise well nourished and healthy looking. She had had pain and discharge from the left ear canal for the past two years. Of late, the discharge had become foul smelling and serosanguineous. The left ear canal was filled with fungating tumor tissue. The tuning fork was lateralized to the left, and the Rinne test was negative on this side. There was no facial paralysis or mastoid tenderness. The blood count and bleeding time were not remarkable; the Wassermann reaction of the blood was negative. The cardiogram showed left axis deviation. The remainder of the physical examination elicited nothing remarkable.

Roentgenograms showed the left mastoid to be clouded and the cell outlines poorly defined. The right mastoid was normal in appearance.

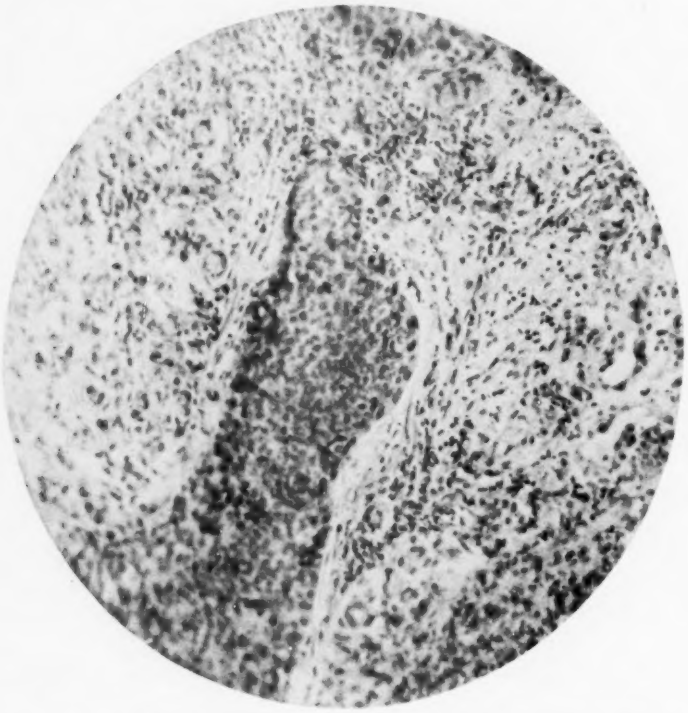

Fig. 4 (case 7, table).—Section of tumor diagnosed as squamous cell carcinoma.

The patient was hospitalized, and on December 4 a radical mastoidectomy was performed through the usual postaural incision and with use of nitrous oxide-oxygen-ether anesthesia. When the antrum was opened, it was found to contain tumor tissue which had extended from the middle ear cavity and had destroyed the tympanic membrane. The facial nerve was not uncapped, but some dura was exposed in the tegmen antri. The mastoid wound was packed with petrolatum-sulfanilamide gauze and allowed to granulate of its own accord.

The postoperative course was not remarkable. On Dec. 28, after the left ear canal had healed, a radium element applicator of 0.6 mm. of platinum wall thickness, containing 10 mg. of radium, was placed in the cavity of the left middle ear and mastoid for a 200 milligram hour dose. Since no unusual reaction was noted, the treatment was repeated on December 30 with application of 5 mg. of radium for 26 hours, thus giving 130 milligram hours additional

irradiation of this area. This treatment was followed by diminution of pain and drainage from the left ear canal. The postaural wound was closing in nicely. X-ray therapy (200 kv., 0.9 mm. Cu half-value layer), applied over the left mastoid and ear canal, was started on Jan. 18, 1944, and continued to February 1, 300 r being given daily up to a total dose of 3,900 r. Thereafter there was further improvement; the discharge diminished, there was little head pain and the postaural wound closed. The patient was discharged on February 2, with a slight skin reaction to the x-rays and a dry external left ear canal. Thereafter she remained well and free from recurrence so far as the ear condition was concerned; the left canal was dry and well epithelized over, and the postaural wound remained healed. Some time later she was operated on for the "fourth" primary carcinoma in the right breast; she recovered from this operation but died in October 1949 of bronchopneumonia, the ear remaining healed.

SUMMARY

We have cited our experiences in the diagnosis and management of 10 cases of tumor of the middle ear and mastoid. Seven were classified as cases of squamous cell carcinoma; in two of these the patients have remained well and free of disease over five years. Two cases, more controversial, have been reclassified as cases of glomus jugulare tumors. One of the patients is apparently well and free of disease for over five years, and the other is living, steadfastly refusing operation, and comfortable for over eight years.

Early diagnosis by symptomatology, biopsy of any or all ear canal growths, radical surgical exenteration or electrocoagulation of the lesion followed by intracavitary application of radium and external irradiation are the methods of choice.

So far as can be ascertained, the two cases of squamous cell carcinoma primary in the middle ear and mastoid reported by Thorell [10] and the two cases cited here are among the few in which are recorded five year or better arrests from this disease. However, we feel that there must be other, unreported cures.

PROBLEMS OF THE SEPTUM IN RHINOPLASTIC SURGERY

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NO SINGLE method of correction associated with reconstruction of an external nasal deformity is applicable in every case of anterior dislocation and deviation of the septum. A knowledge of the underlying abnormality and a command of several operative approaches to the problem must be combined with judgment on the part of the surgeon if the condition is to be treated successfully.

In my experience, the Metzenbaum [1] operation, altered by utilizing the rhinoplastic approach, has usually been a satisfactory method of correcting twisting or hypertrophy of the nose combined with dislocation and deviation of the septum. However, certain modifications of the procedure have materially increased its usefulness.

As originally described, Metzenbaum's procedure consists essentially in shifting the anteriorly dislocated septal cartilage to the midline to avoid radical removal, the latter procedure having been advocated at the turn of the century by such authorities as St. Clair Thomson,[2] Freer [3] and Killian.[4] In 1937, Peer [5] expressed the opinion that radical removal may be necessary for certain types of deflection but that a cartilage graft should be used in the anterior position to replace the septum. Foman [6] and his group recently described a method similar to that of Peer, but incorporating

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From the Division of Maxillofacial Surgery, Department of Otolaryngology, University of Illinois College of Medicine, and the Plastic Surgery Service, University of Illinois Eye and Ear Infirmary.

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the rhinoplastic approach of Joseph [7] and based on an original concept of nasal structure. These techniques, however, apply primarily to correction of the deviated-dislocated septum alone. A more complex problem arises when corrections of an external deformity and a septal deformity are combined.

Metzenbaum replaced the dislocated septum with a minimal sacrifice of cartilage by crosscutting and vertically slicing the cartilage, freeing it from its base and placing it on a groove in the vomer and into a pocket in the columella. He accomplished this without interference with the mucosa and perichondrium on one side of the septum and without transfixion (i. e., freeing) of the septum from the columella or detachment of the upper lateral cartilages from the septum. This method may result in incomplete straightening of the dorsum, and the septal cartilage may shift back to its original position.

Many excellent variations of Metzenbaum's original procedure have been developed to increase the practicability of the operation and also permit it to be combined safely with rhinoplasty. Modifications described by Safian,[8] Salinger,[9] Peer,[5] Cohen,[10] Seltzer,[11] Steffensen,[12] Maliniac [13] and others unite the Metzenbaum technique with the rhinoplastic approach of completely freeing the septum from the columella by transfixion, detachment of the upper lateral cartilages from the septum and mobilization of the nasal bones for correction of external deformities.

The methods to be described are similar in principle to many of the previously mentioned techniques but are based on a different concept of the etiological and anatomic-pathological factors. They may be utilized either for correction of the septal deformity alone or in combination with rhinoplasty. Correction of the septal and the external nasal deformities should be combined whenever feasible. Since the procedures are interdependent, a better evaluation of the problem is possible when they are done together, and the patient is saved considerable time and discomfort.

ETIOLOGICAL AND ANATOMIC FACTORS

Phylogenetically, the formation of the palate is largely responsible for the development of the septum. In lower animals the formation of the palate serves as a protective mechanism for separating the mouth cavity from the nose and also as a means of developing a larger olfactory organ.

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7. Joseph, J.: Nasenplastik und sonstige Gesichtsplastik: Nebst einem Anhang über Mammaplastik und einige weitere Operationen aus dem Gebiete der äusseren Körperplastik, Leipzig, Curt Kabitzsch, 1931.

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11. Seltzer, A. P.: The Nasal Septum: Plastic Repair of the Deviated Septum Associated with a Deflected Tip, Arch. Otolaryng. **40**:433 (Dec.) 1944.

12. Steffensen, W. H.: Reconstruction of the Nasal Septum, Plast. & Reconstruct. Surg. **2**:66 (Jan.) 1947.

13. Maliniac, J. W.: Role of the Septum in Rhinoplasty, Arch. Otolaryng. **48**:189 (Aug.) 1948.

Ontogenetically, it is during the fourth week of embryonal life that the frontonasal process and the nasal pits (olfactory placodes) are formed. These pits, each of which has two well defined raised surfaces, a lateral and median nasal process, invaginate and communicate with the mouth cavity. It is from the fusion of the median nasal processes that the philtrum of the upper lip, the nasal septum and the premaxilla are formed. The median nasal processes also fuse with the maxillary processes of the first branchial arch to form the upper jaw.[14]

The formation of the upper jaw shuts off the communication between the nasal pits and the mouth slit. The premaxilla forms the section of the permanent palate as far as the incisor foramens and approximately indicates the position of the original (primary) choanae. Fusion of the septum with the primary (premaxillary) and the secondary palate completes the separation of the two nasal passages. The nasal passages thus consist of the original nasal pits which have invaginated plus a portion of the primitive mouth cavity that has been appropriated by the development of the palate.[15]

By the third month of fetal life, the nasal capsule is mostly cartilaginous, but some sections are still in a precartilaginous state. Sections of the cartilaginous nasal capsule persist and are present in the adult nose as the quadrangular cartilage and external nasal cartilage.

At birth, the septum is almost completely cartilaginous, with the exception of the vomer and the two premaxillae and their processes. The vomer develops bilaterally on each side of the cartilaginous nasal septum from a pair of ossification centers which are present at the beginning of the third month of fetal life. The bilateral plates of the vomer unite from behind and grow forward at the expense of the imprisoned cartilage and complete their development at the age of 15 years. Indication of the bilateral origin of the vomer is evident in the infant by a deep groove between the two plates. In adult life, the groove is somewhat flattened.

The development of the premaxilla parallels that of vomer, but after the age of 6 years it develops very rapidly. The ethmoid bone begins to ossify during the first year of postfetal life and is not completed until the end of the seventeenth year.

At birth, neither the palate bones nor the maxillae rise into a crest for the support of the lower edge of the septum, but in the adult these bones have marked crests. The upward growth of the crests, along with the development of the premaxilla and vomer, conflicting with the downward growth of the septum from the ethmoid ossification centers, along with the downward expansion of the cranial cavity, may account for many deviations and dislocations of the septum. This disproportion of growth with pressure on the cartilaginous septum as a causative factor in the septal deformities was emphasized by Mosher.[16]

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14. Van Alyea, O. E.: The Embryology of the Ear, Nose and Throat, prepared for the use of graduates in medicine by the American Academy of Ophthalmology and Otolaryngology, Section on Instruction, 1949.

15. Arey, L. B.: Developmental Anatomy: A Textbook and Laboratory Manual of Embryology, ed. 5, Philadelphia, W. B. Saunders Company, 1946.

16. Mosher, H. P.: The Premaxillary Wings and Deviation of the Septum, Laryngoscope **17**:840 (Nov.) 1907.

The vomer and premaxilla are enveloped by a periosteal covering, which separates the bone portion of the septum from the cartilaginous septum, which, in turn, is enveloped in perichondrium. Microscopic studies of sections removed from the junction of bone and cartilage at the vomeroseptomaxillary crest region reveal the perichrondrial envelopment of the septal cartilage and its fusion with the periosteum of the bone below. The two opposing membranes form a smooth surface between bone and cartilage, especially at the junction of vomer, maxillary crest and maxillary spine, where the groove of the vomer is usually shallow or flat. This region is, therefore, a weak point and a frequent site for dislocations on a traumatic basis. Furthermore, the bones themselves form a smooth surface with one another. The lower end of the vomer is smooth and rests on the smooth concave surface of the maxillary crest, which, in turn, rests on the smooth concave surface of the nasal spine.

From my observations at the operating table, the majority of patients presented a dislocation accompanied with a deviation of the vomer and maxillary crest and spine along with the septal cartilage. The malformations were either developmental in origin, or the patients had a history of trauma before the age of 6 or 7 years. Trauma in early childhood is an important factor, as the maxillary crests and vomer are not completely ossified and a slight shifting of these tissues may cause the crest and vomer, as they develop, to grow to the side. This will result in a flattening of the vomer, an groove and the loss of its lip on the side of deviation. Some of these deformities may possibly have their origin in birth trauma. The dislocations in which the septal cartilage was displaced from the vomer and maxillary crest were usually traumatic in origin, the time of the injury occurring, in most instances, sometime after the age of 6 or 7 years. The complicated septal dislocation, accompanied with a buckling, twisting and reduplication of cartilage and marked external deformity of depression and deviation, was invariably on a traumatic basis.

Some developmental factors in the origin of the dislocated septum may be gathered from the embryonal description of the nasal-palatal relationship and the influence of palatal development on the floor of the septum. The formations of the premaxilla, the eruption of the permanent incisor teeth, the asymmetrical development of the maxillary sinuses, thumb-sucking and tongue pressure habits with resulting shifting of the alveolar ridge, mouth breathing and congenital deformities such as a cleft lip and palate may be a few causative factors accounting for developmental disturbances. The eruption of the permanent incisor teeth and its effect on the septum was well described by Mosher,[16] who felt that deformities of the septum are rather infrequent and rarely very marked in children before the second dentition. However, the disproportion in growth among the premaxilla, vomer and ethmoid, with downward encroachment of the cranial cavity, is most probably the dominant factor.

CLASSIFICATION AND CORRECTION

Dislocations and deviations of the septum may be classified in two groups, developmental and traumatic.

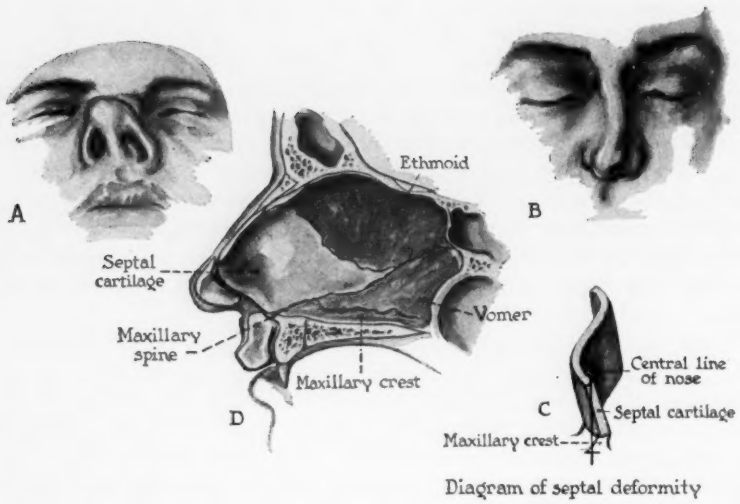

Fig. 1.—Development type of septal deformity. *A*, dislocation of septum into left nostril, *B*, deviation of nasal dorsum to right. *C*, diagrammatic sketch of septal deformity revealing underlying bony portion deflected along with cartilaginous portion; midline of nose externally indicated by solid vertical line. *D*, lateral view of septum.

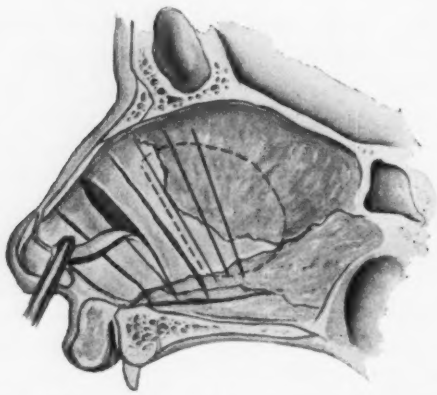

Fig. 2.—Correction of developmental type of septal deformity. After unilateral elevation of mucoperichondrium, vertical incisions are made through cartilage extending into maxillary crest and vomer, which is then completely fractured through base. Section of cartilage is removed vertically at angle of deflection to break spring. Posterior resection of cartilage, when indicated, is outlined by dotted line. Upper lateral cartilages are left intact at midline when extent of rhinoplasty permits.

The Developmental Type.—In the developmental type of septal deformity, the cartilaginous septum is dislocated and deflected and there is similar deviation of the underlying bony septum (fig. 1). The cartilage is separated from the bone by a smooth layer of perichondrium and periosteum. Because of this smooth sliding surface between them, the freeing of the cartilage at its junction with the underlying bone may be insufficient to prevent the septum from slipping back into the original position of dislocation. Moreover, the gradual pull of the shortened mucosa on the side of the dislocation may gradually shift the cartilage on its smooth bed back to its original position.

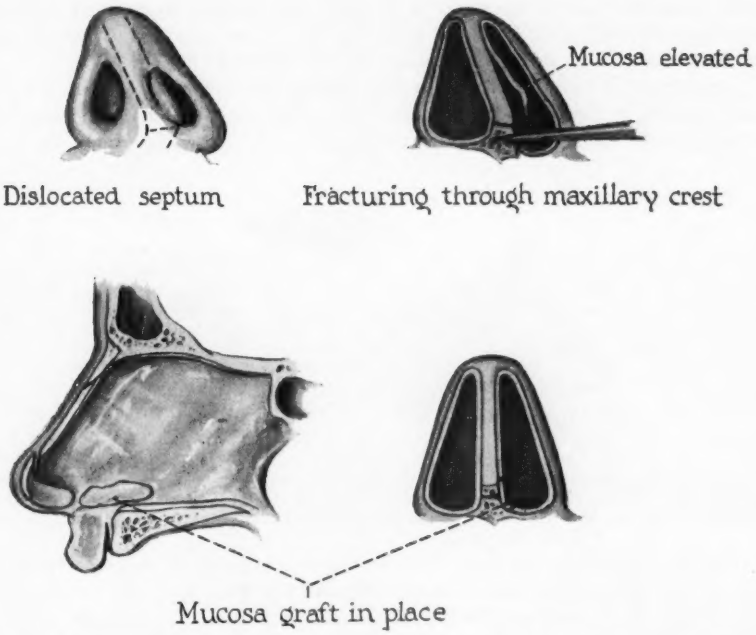

Fig. 3.—Mucoperiosteal-mucoperichondrial flap cut at floor of nose after shifting of septum to midline. This is done to prevent recurrence of deformity by pull of short mucosa. Maxillary spine and crest and lower end of vomer are completely fractured at base. Scar contracture is prevented by mucous membrane graft to cover created defect. Smooth perichondrial-periosteal junction between bone and cartilage retains its original relationship.

To prevent such recurrence, the cartilage should not be cut at its junction with the vomer and maxillary bone but should be shifted as a unit with the bony septum. This is accomplished by completely fracturing the maxillary spine and crest and the lower end of the vomer from the floor of the nose and shifting the entire lower end of the septum to the midline. Complete fracture through the bone prevents recurrence of the deformity, because the bone, unlike resilient cartilage, has no tendency to move after it has been fractured and set in position. Equally important is the fact that the fracture along the floor leaves the smooth sliding perichondrial-periosteal surface undisturbed.

To insure further the replacement of the septum in the midline and to prevent possible scar contracture or pull due to shortening of the mucosa, which results from shifting of the bone and cartilage to the midline, an incision is made in the mucous membrane along the floor of the nose and lateral to the region of the fracture line. A free graft of mucous membrane or, better, a composite graft of mucosa and cartilage is placed over the raw area. The graft "takes" rapidly, and by the sixth or seventh postoperative day the nasal floor is completely healed. Tissue for grafting may be obtained from the shortening of the upper lateral cartilages and used as two grafts, or, if the septum is shortened, the removed section of cartilage with attached cutaneous-mucosal surface on one side may be utilized as an alternative composite graft along the floor of the nose. If tissue is not available from either of these sources, a mucosal graft from the under surface of the inferior turbinate of the untreated nostril or a graft of buccal mucosa may be used (fig. 3).

After fracture through the bony septum, the septal cartilage should be cut vertically through its height, and, when necessary, narrow sections should be removed at the bends in the cartilage. The vertical incisions are carried down into the bone

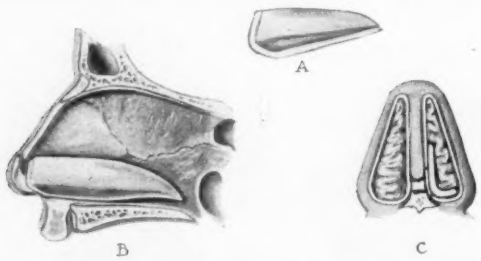

Fig. 4.—Pink base plate paraffin and wax compound placed as angulated strip to hold mucosal graft in place, followed by petrolatum gauze packing. Petrolatum and wax packs are removed on fifth day postoperatively. Wax prevents dislodgment of graft when packs are removed.

to join the fracture at the base. This should be accomplished without disturbing the perichondrium and mucosa on the opposite side (fig. 2). The perichondrial attachments of the opposite side are left intact, not so much to insure the viability of the cartilage as to help prevent the anterior segment of cartilage from slipping back or down after it is cut. The perichondrial and mucosal attachment thus acts as an adherent plate to the cartilage. This mucosal attachment on the opposite side of the anterior dislocation is disturbed only when it is desirable to thin down thickened cartilage or a ridge, usually along the floor in the region of bone and cartilage approximation. The deflected posterior portion of the septum may be removed according to the indications.

The upper lateral cartilages, which often are an integral part of the septal deformity, should be freed from the septum in the majority of cases. When the cartilages are twisted along with the septum, a readjustment may be necessary to avoid pulling by the shorter upper lateral cartilage, which may cause recurrence of the deformity and prevent complete straightening of the twisted dorsum. This readjustment is accomplished by detaching the cartilages from the septum, but it is not always advisable because the upper lateral cartilages are intimately bound to the

septum and function as lateral stabilizing extensions of the septum. These cartilages together with the septal cartilage thereby maintain the stability and form of the cartilaginous dorsum. In many cases, depending on the septal abnormality and the extent of the rhinoplasty (e. g., cases of a small bony hump and/or a nose which does not require shortening), it is not necessary to free the upper lateral cartilages,

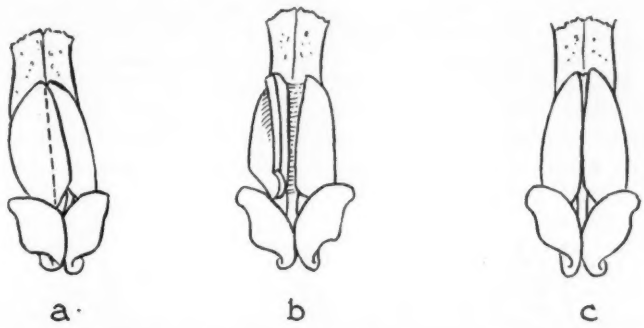

Fig. 5.—During rhinoplasty, when correction is done through transfixion incision and upper lateral cartilage attachments to the septum are completely freed, anterior segment of freed cartilage may shift back, as indicated in sketch. Intact upper lateral cartilages or central freeing of upper lateral cartilages with mucoperichondrial attachments intact or lateral freeing will prevent this. Posterior resection of septum, with vertical strip left, when possible, behind section removed at angle of deflection, may then be carried out. If upper lateral cartilages are freed from septum, extensive posterior resection of septum should not be done. Mattress suture should be inserted through anterior segment and posterior portion of septum. This suture plus firm packing of nose, will hold anterior segment in position and prevent it from slipping back.

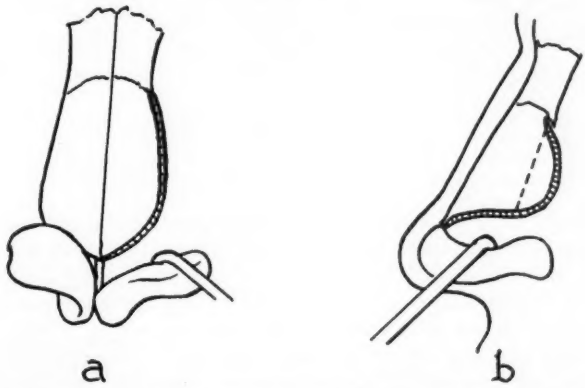

Fig. 6.—Central freeing of upper lateral cartilages from septum for marked twist, with mucoperichondrial attachments to the septum left. Section of upper lateral cartilage is removed to equalize them.

since shifting of the septum will readjust their position. In other cases, infracture of the nasal and maxillary bones plus shifting of the septum will readjust the position of the upper lateral cartilages. In still others, partial division of the upper lateral

cartilages from the septum will take care of the matter. If complete division of one or both cartilages from their dorsal attachment to the septum is necessary, the underlying mucosa and perichondrium should be left either completely or partially intact and attached to the septum, to maintain some fixation or continuity between upper lateral and septal cartilages. After the nose has been packed and splinted, fibrous adhesions will form a fixation between the cartilages (figs. 5 and 6).

Since it is highly advisable not to detach the upper lateral cartilages from the septum, a lateral freeing procedure can be used to mobilize them. This procedure consists in freeing the lateral borders of the upper lateral cartilages from the soft tissue and the maxillary bone, but not from the under surface of the nasal bone, so that the central septal attachment remains (fig. 7). This remaining attachment will prevent the septal cartilage from slipping backward after it is cut vertically, even if the septum is resected behind the thoroughly freed and crosscut anterior segment of septal cartilage.

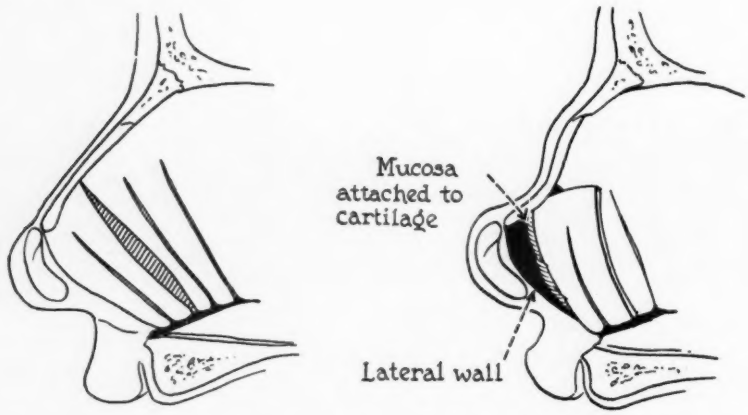

Fig. 7.—Lateral freeing of upper lateral cartilage. Unilateral or bilateral freeing may be done to cut traction forces of shorter upper lateral cartilages, which may pull septum to side. Attachment of upper lateral cartilage to nasal bone is not disturbed. Vertical cut or cuts, indicated by dotted line, will help break the spring of the upper lateral cartilage.

When a large hump is removed and a marked shortening of the nose is indicated, the upper lateral cartilages with their mucoperichondrial attachments are freed from the septum. In such cases it is not advisable to remove much of the posterior portion of the septum, since it is often necessary to place a mattress suture between the free anterior segment and a stable or fixed posterior portion of septal cartilage. If a large fixed posterior strip of cartilage is left intact and attached to the bone below, it is possible to resect the septum behind it. Firm nasal packing is necessary to allow healing of the segments.

Sutures to approximate the septum to the columella are inserted without tension. The cartilage of the septum should not be sewn into a pocket between the two medial crura, for the natural contour of the membranous septum and columella may be destroyed, resulting in an unnatural firmness of the nasal tip. Pink base plate wax strips and small light petrolatum packs are inserted into each nostril for hemo-

stasis and to retain the position of the mucosal graft, the septal mucosa and the skin lining of the lower lateral cartilages (which are trimmed during the rhinoplasty) (fig. 4). Excessive packing, wiring of the septum to a tooth or pyriform crest, and large wax plugs are unnecessary, since the septum is completely mobilized and placed in a central position without any tendency toward recurrence of the dislocation. The packing is left in position for five days, along with a dental mold reenforced by a copper or tin splint for the external nasal correction.

The Traumatic Type.—The septal deformities encountered after trauma may be divided into three groups: (1) the lateral type, which usually results from a lateral fracture of the nose with displacement of the septum from the vomerian groove and maxillary crest; (2) the depressed type, following a crushing frontal

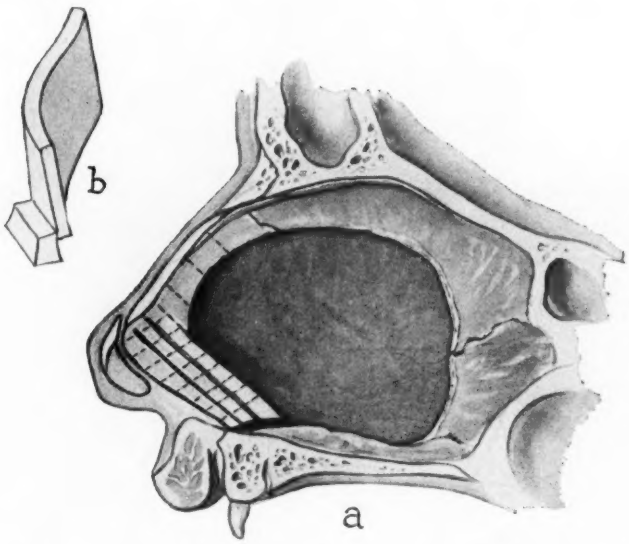

Fig. 8.—Lateral traumatic deformity with dislocation of cartilaginous septum from bony septum (*b*). Correction is accomplished by vertical cuts through anteriorly dislocated septum and by removal of portion of bone and cartilage from base of septum to allow placement of septum in midline. In some cases, septum can be replaced on vomer and maxillary crest after cutting of its attachments to the bone. Removal of posterior deflected portion and vertical cuts through remaining subdorsal septum are done when indicated.

fracture and resulting in a bizarre septal configuration of buckling, twisting, reduplication and fibrosis, and (3) the laterofrontal type, which combines the first two types but more frequently is an accentuation of the lateral type.

The lateral type of traumatic septal deformity (fig. 8) is corrected by methods similar to those used in treating the developmental type of deformity. However, in this type the cartilage is shifted from the vomer and maxillary crest, in contradistinction to the complete shift of bony and cartilaginous septum found in the developmental deformity.

It is therefore necessary not only to use the methods outlined for the developmental type of deformities but also to replace the septal cartilage on the vomerian groove. After the maxillary crest and vomer are fractured, the cartilage is cut at its base, the vomerian groove is cleansed free of scar and periosteal tissue and the cartilage is replaced. This may necessitate freeing or cutting the mucosa on the opposite side of the septum. In other cases, the added resection of an angulated or wedge-shaped strip of cartilage and bone at their juncture may be necessary. The

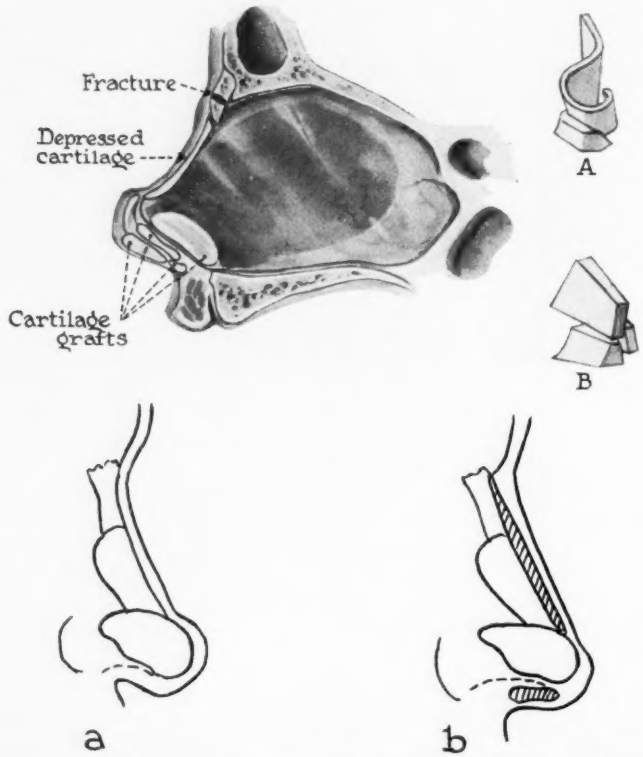

Fig. 9.—Top, depressed traumatic deformity of septum with buckling, twisting and reduplication of septum (*A* and *B*). Septum is completely removed, and removal is followed by columellar grafts and replacement of section of cartilage behind columella. These are inserted to prevent retraction of columella. A graft of bone or cartilage is placed over dorsum to correct depression. Bottom, depressed traumatic deformity revealing columellar and dorsal implant to correct depressed nose.

resection of an angulated strip of bone and cartilage is indicated when there is proper profile projection of the nasal dorsum. If the cartilaginous dorsum is depressed, the replacement of the septum on the vomer and maxillary crest without the removal of a wide strip will often automatically raise the height of the dorsum and result in a proper profile projection.

The depressed type of traumatic septal deformity poses a different problem from those of developmental and lateral traumatic deformities (fig. 9, top). In most cases, it is impossible to shift the septum back into position by the foregoing procedures, and wide resection of the crushed septum is necessary.

Whenever a wide or thorough resection is required, the stability of the nasal dorsum is endangered. However, when complete resection is necessary, the stability of the dorsum usually is not a problem, since the nose is already depressed. The procedure resolves itself into refracture of the nasal bones, thorough resection of the septum, including the dislocated lower portion, and implantation of a graft [17] to the nasal dorsum and to the (usually) retracted columella [18] (fig. 9, bottom). When the nose is both twisted and depressed, the upper lateral cartilages should not be freed from their attachment to the septum, since refracture of the nasal bones and complete resection of the septum will usually shift their position to the midline.

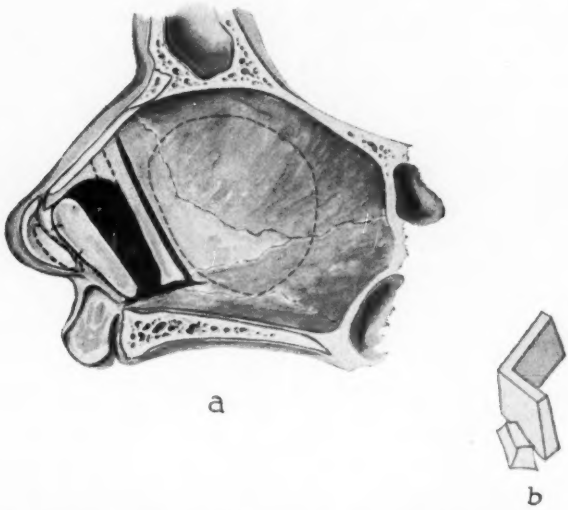

Fig. 10.—Laterofrontal traumatic deformity with marked angulation of cartilage and displacement from underlying bony septum (*b*). This deformity may often be corrected by procedure outlined under lateral traumatic type (fig. 8). In many cases anterior portion of septum is removed and replaced by section of cartilage (*a*). Posterior portion of septum is then cut, vertical strip removed at angle of deflection and base fractured into position. Beam of cartilage is left under dorsum to prevent depression of lower dorsum. This subdorsal beam may be cut vertically (dotted line) to break spring. Columellar graft is inserted to prevent retraction of columella (dotted area in columella). In occasional cases it may be necessary to remove entire anterior segment, but this may necessitate correction of dorsum for a saddle; however, this depends on extent of rhinoplasty, structure of upper and lower lateral cartilages and whether it is necessary to free upper lateral cartilages from septum.

17. Mowlem, R.: Bone and Cartilage Transplants: Their Use and Behavior, Brit. J. Surg. **29**:182 (Oct.) 1941.

18. Becker, O. J.: Aids in Rhinoplastic Procedures, Ann. Otol. Rhin. & Laryng. **55**:562 (Sept.) 1946; Nasal Fractures: An Analysis of 100 Cases, Arch. Otolaryng. **48**:344 (Sept.) 1948.

When complete straightening does not result from refracture, either central freeing with mucoperichondrial attachments to the septum or lateral freeing of the upper lateral cartilages will adjust their position.

The laterofrontal type of traumatic deformity results in a marked twist of the lower end of the septum and nasal dorsum, but the dorsum is not especially depressed (fig. 10). This type may usually be corrected by the procedures outlined under the lateral type, but at times it may be necessary to remove the lower end of the septum completely. The question of stability of the dorsum becomes important

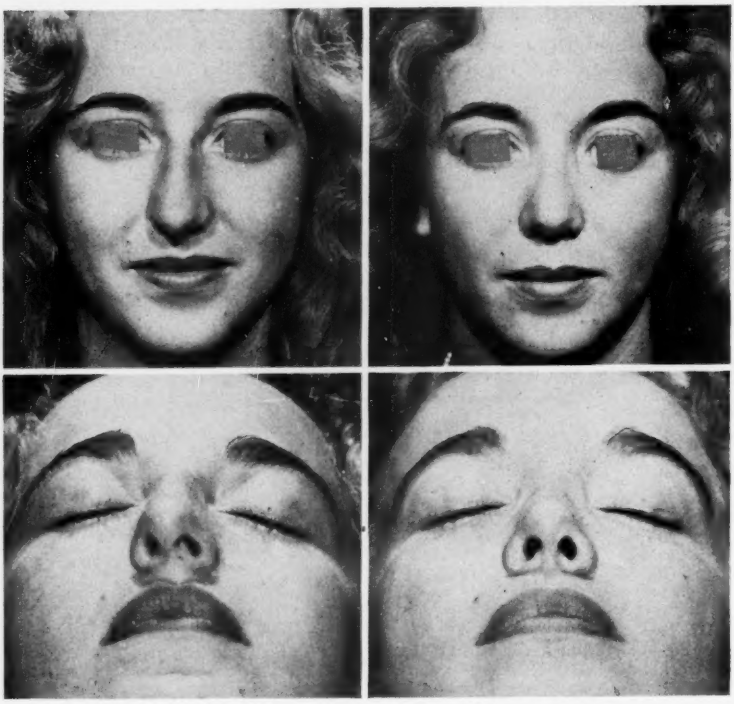

Fig. 11.—Developmental septal deformity with dislocation and hump of dorsum corrected in one stage by procedure outlined for developmental deformity (figs. 1, 2 and 3).

in cases in which removal of the lower end of the septum is indicated. Since the nasal dorsum is in a relatively good position, it is almost always necessary to leave the upper lateral cartilages attached to the septum in order to protect the projection of the nose. Resection of the dislocated anterior septum, bilateral osteotomy of the frontal processes of the maxilla and lateral freeing of the upper lateral cartilages in most cases will correct the deviation and dislocation of the septum and straighten the dorsum.

During correction of the septum, however, it is highly advisable to maintain the support of the dorsum by leaving a narrow strip of subdorsal cartilage attached to the under surface of the upper lateral cartilages. This strip or beam should extend to the extreme lower border of the septum to prevent sagging of the dorsum, particularly in the area which is dependent on the septum for maintenance of the dorsal projection. This beam should be cut vertically when indicated, a section of cartilage removed at the posterior angle of deflection and the base fractured to shift the septum to the midline. It is possible in some cases to remove the lowermost portion of this cartilaginous beam and still maintain the profile, but only when the upper lateral cartilages are long, extending to the tip of the septum, and when the lower lateral cartilages are well developed and either firmly bound to the upper lateral cartilages or large enough to override the central portion of the upper lateral cartilages. Usually these conditions are lacking; instead, an area of septum about 0.75 cm. long is devoid of upper lateral cartilage covering, and the fibrous union of lower to upper lateral cartilage in this region is often too weak to prevent a depression just superior to the tip of the nose. Furthermore, if unusually firm fibrous attachments and overlapping upper and lower cartilages hold the nose in position without any septal support, there is always the risk that some slight trauma to the nose may cause a depression at a later date. The upper lateral cartilages alone cannot withstand much trauma without the additional reserve support of the septum. However, a narrow beam of septal cartilage, extending beyond and under the upper lateral cartilages and continuous posteriorly with the ethmoid plate and vomer, will furnish adequate reserve support to resist trauma. A large section or smaller segments of cartilage used to replace the completely resected septum will not furnish the stability and support that this beam of cartilage provides. However, even when this beam is preserved, it is necessary to replace a section of cartilage just behind and into the columella,[18] not to serve as a support but to prevent retraction of the columella.

Obviously, only a limited rhinoplasty can be combined with this type of septal correction. Many deformities of this type, however, can be adequately corrected by the methods outlined under the lateral type of deformity, thereby allowing a more extensive rhinoplastic correction. This fact is especially true of a long nose deformity which requires shortening of the lower end of the septum.

GENERAL CONSIDERATIONS

The rhinoplastic portion of the operation is accomplished by the basic Joseph[6] technique, with personal modifications. The extent of the rhinoplastic reconstruction is dependent on the type of deformity encountered and is partially completed before the septal correction; the two procedures, however, are almost always combined in the one operation.

The methods outlined may also be used to good advantage in cases done without a rhinoplastic correction, but they should be accomplished through the use of the rhinoplastic approach. This implies the use of incisions in both limina vestibuli, freeing of the skin from the overlying lower half of the nasal dorsum and, in most cases, transfixion of the septum from the columella. With this maneuver, better exposure of the septum is obtained, and, if necessary, sections of the upper lateral cartilages may be freed and trimmed.

All septal corrections are accomplished through the original transfixion incision, thus eliminating any secondary incisions inside the nose which may possibly cause scar formation. However, if it is unnecessary to elevate the nasal tip, a complete transfixion incision may not be needed. Instead, an incision on one side of the free septal border is made, i. e., on the side of the dislocation, thereby allowing a complete and continuous attachment of the mucosa of the opposite side down to the columella. However, in most cases a complete transfixion of the septum is necessary, but when a complete transfixion is not indicated, a one half or three fourth transfixion may be all that is necessary. The latter is advantageous in some cases, as it allows a firmer attachment of the membranous and cartilaginous septum to the columella.

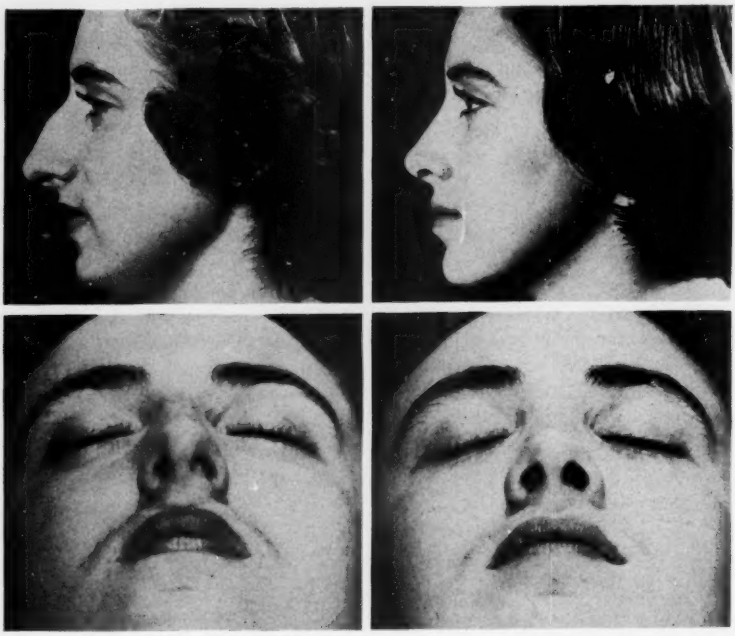

Fig. 12.—Developmental septal deformity in long nose. Section of anterior septum was removed to shorten nose, and posterior portion cut vertically and fractured through base to replace cartilage in midline. Lower ends of upper lateral cartilages were freed and removed (figs. 1, 2 and 3).

After 10 per cent cocaine or 2 per cent tetracaine hydrochloride (pontocaine hydrochloride®) surface anesthesia, a 1 per cent solution of procaine hydrochloride containing 1 : 50,000 epinephrine hydrochloride is infiltrated under the septal mucosa and perichondrium for better anesthesia and to provide hemostasis and facilitate dissection.

When the septum is deviated without an anterior displacement and without causing an external deviation of the nasal dorsum, a submucous resection is done just before the completion of the rhinoplasty. The mucosal flap is elevated on the

side of the deviation through the rhinoplastic transfixion incision. The septal resection may be necessary to aid in the narrowing of the nasal bridge and/or to correct any nasal obstruction. A complete submucous resection or excessive removal of the septum is rarely indicated. Only that part which is deflected should be removed. This removal may be accomplished after elevation of the perichon-

Fig. 13.—Lateral traumatic deformity. Septum corrected by procedure outlined for this type, combined with refracture of nasal bones and frontal processes of maxilla to replace nose in midline (fig. 8).

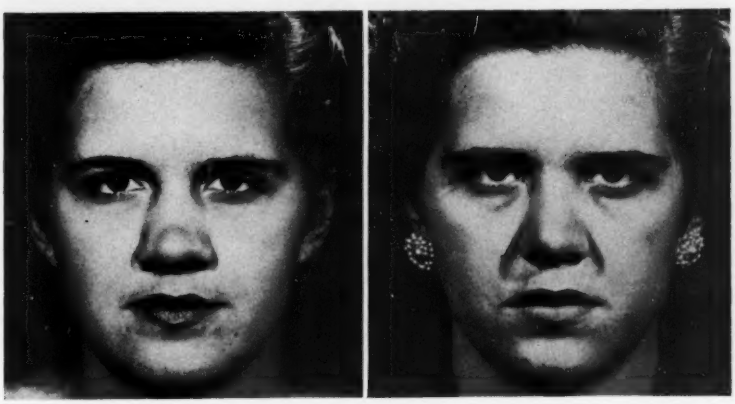

Fig. 14.—Depressed traumatic deformity corrected by complete removal of septum combined with dorsal autogenous bone transplant and columellar implant of septal cartilage. Nasal bones infractured and tip corrected, accomplished in one stage operation (fig. 9, top).

drium of the posterior portion of the septum on the opposite side. Often the septum is straightened sufficiently by merely vertical incisions and crosscuts through the cartilage without elevation of the perichondrium on the opposite side or removal of any cartilage. Occasionally, a few vertical strips of cartilage are removed to break the spring.

It may be necessary to remove a very thick septal cartilage at its junction with the ethmoid plate to aid in infracture of the nasal bones and to narrow the bridge. A depression of the nasal bones will not follow this maneuver provided the nasal bones are not outfractured or separated from each other by chiseling through the junction of the two nasal bones. The bones may be shifted to the midline as one unit by infracting them without disturbing the attachments of the septum to the frontal spine and the under surface of the nasal bone. To mobilize the bony bridge completely, without separation of the nasal bones at the midline and without outfracture it may be necessary to fracture the bones completely by chiseling through the nasal frontal region, either through the original osteotomy incision or through a

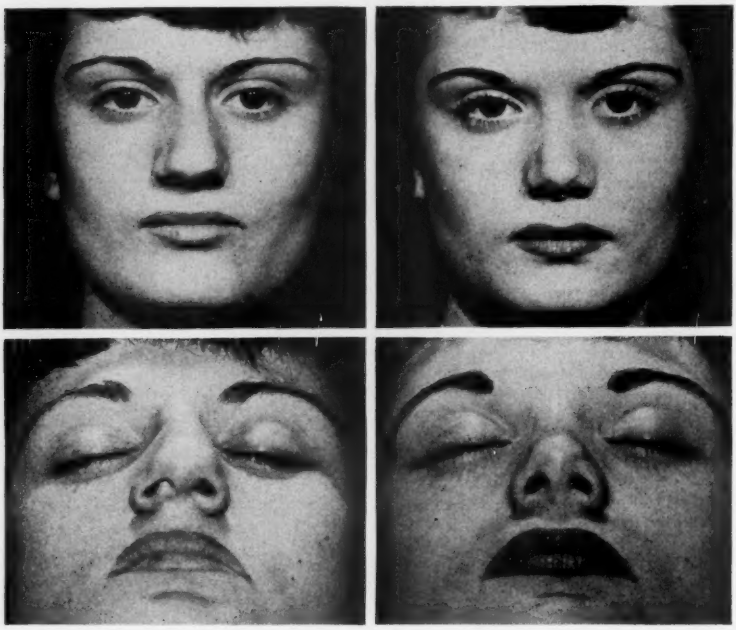

Fig. 15.—Laterofrontal traumatic type of deformity, corrected by removal of cartilage anteriorly but with beam of cartilage left under the dorsum, which was crosscut and held in position with wax and petrolatum packing. Lateral freeing of upper lateral cartilages and insertion of columellar (septal cartilage) graft (fig. 10).

small external incision at the lateral side of the nasion. If it is necessary to separate the nasal bones or remove a wedge from the bony radix, the removal of a large section of septum in this region should not be attempted; instead, a fracture of the septum should be accomplished with an Ash septal forceps.

In the case of a long nose, the correction of an anterior dislocation may in some cases be corrected simply by shortening the septum and lower ends of the upper lateral cartilages. Since removal of an anterior segment of septal cartilage is necessary for the correction of nasal length, it may also be sufficient to correct the

dislocation. However, it is usually necessary to fracture the maxillary crest behind the area which has been removed in the shortening procedure. Any further posterior deviation of the septum is corrected by the removal or crosscutting of the deviated cartilage and bone.

SUMMARY

An etiological and anatomic basis for the classification of septal dislocations and deviations is presented. These deformities may be divided into the developmental and the traumatic groups. The traumatic group is subdivided into three types: (1) the lateral type, (2) the depressed type, and (3) the laterofrontal type.

Methods of correcting the various septal deformities are discussed. These methods may be utilized for the correction of the septal deformity alone or combined with rhinoplasty. The degree of septal correction in the combined operation is governed by the extent of the rhinoplastic reconstruction and vice versa, since the two procedures are interdependent.

The view is maintained that the septum should be manipulated into position by vertically cutting and removing narrow sections of cartilage and by fracturing the bony portion into position. It is only in the depressed type and in some cases of the laterofrontal type that large sections of septal cartilage must be sacrificed.

30 North Michigan Avenue.

TUMORS OF THE LARYNX

Review of One Hundred and Sixteen Cases

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THERE have been developed many revolutionary treatments, especially in the surgical management of a number of diseases, during the last decade. There is no longer any great fear of lengthy surgical operations or infection as there has been in the past. The administration of blood during operation to combat shock and the use of antibiotics has brought operative mortality to a new low. We were prompted to review all the cases of tumor of the larynx for the past 10 years at two hospitals, the Hermann Hospital and the Jefferson Davis Hospital, because of the changes brought about in surgical management, especially since the termination of World War II. Our purpose is to see where we stand in the treatment of these tumors, particularly carcinoma of the larynx. Carcinoma and sarcoma are more affected in their treatment by modern surgical principles than are the benign growths.

We have reviewed 116 cases, comprising nearly every type of common laryngeal tumor which has been treated in these two institutions or has been under the care of one of us elsewhere during the past 10 years. In this group, there were 55 cases of benign tumors and 61 cases of malignant neoplasms. The benign tumors have been further broken down into benign neoplasms and inflammatory tumors (table 1).

In the treatment of the juvenile type of papilloma we encountered the same disturbing factors as have plagued the laryngologist for decades, those of multiple and early recurrence. Two of the patients required emergency tracheotomy to relieve the laryngeal obstruction. Neither of us has had the opportunity to use aureomycin in the treatment of juvenile papilloma as suggested by Holinger and associates.[1]

Somewhat better results have been obtained in the treatment of the adult type, but there is a tendency not only for recurrence but also for development of malignant changes. Of the 13 cases of adult type papilloma, two became malignant one and two years respectively after repeated biopsies. In one other case, in which there was a papilloma over the body of the arytenoid, a transplant to the opposite arytenoid took place after removal of the original site. After four removals the original site

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Read before the Texas Society of Ophthalmology and Otolaryngology, Dallas, Texas, Dec. 8-9, 1950.

From the Department of Otolaryngology, Baylor University College of Medicine, and allied hospitals.

1. Holinger, P.; Johnson, K. C., and Anison, G. C.: Papilloma of the Larynx: A Review of 109 Cases with a Preliminary Report of Aureomycin Therapy, Ann. Otol. Rhin. & Laryng. **59**:547-564 (June) 1950.

healed without recurrence. The transplanted site has had recurrences after seven removals, although since the last there is good evidence that there will be no more. It is apparent from review of these few cases that the multiple adult type of papilloma is a precancerous lesion. The single type of papilloma in the adult is not so likely to become malignant. Another of these cases of widespread papilloma in the adult we are observing with interest and suspicion. After scalping the growths several times we have been unable to find malignant changes in any of the specimens to date.

The inflammatory and degenerative types of tumors are not to be discussed in this report.

Keratosis is not frequently associated with malignant growth, but for one of our patients the pathological diagnosis was keratosis associated with malignant changes. The other two patients have shown no changes after three years. The original site was seen to be consistent with normal epithelium on indirect laryngoscopy. New and Erich [2] report an incidence of one case in 10 and Jackson and Jackson [3] report no occurrence of malignant changes either with or removal of the keratotic area.

TABLE 1.—*Types of Benign Tumors*

Types	No. of Cases
Benign Neoplasm	
Juvenile papilloma	5
Adult papilloma	13
Inflammatory tumors	
Granuloma following intubation for anesthesia	2
Inflammatory tissue	3
Fibrous vocal nodule	12
Vocal cord polyps	15
Degenerative lesions	
Amyloid tumor	1
Premalignant tumors	
Keratosis	3
Leukoplakia	1

These so-called benign neoplasms have been discussed here because of their malignant tendency. A survey of the malignant tumors of the larynx was the inciting factor in this review. Our objective was to find the relation of intrinsic to extrinsic carcinoma in this group and the type of treatment carried out and to make a comparison with the present day concept. Because most of the surveyed cases have not lasted long enough for a five year cure, our survival rate has little value in regard to the treatment. The problem of the type of treatment for each individual case is still as big as ever, although sometimes the patient makes it easy by absolutely refusing surgery. Among laryngologists there is still some difference of opinion regarding the type of treatment most appropriate, x-ray or surgery.

Of the number of malignant tumors reviewed, which comprise about 55 per cent of the group, all but two were classed as squamous cell carcinoma. In 57 cases the patients were male and in four female or 6.8 per cent of the total number of cases.

These tumors were classified as intrinsic or extrinsic, on the basis of the limits as described by Martin [4] in his anatomic classification. They were placed in the

2. New, G., and Erich, J. B.: Benign Tumor of the Larynx: Study of 722 Cases, Arch. Otolaryng. **28**:841-910 (Dec.) 1938.

3. Jackson, C., and Jackson, C. L.: Diseases and Injuries of the Larynx: A Textbook for Students and Practitioners, ed. 2, New York, The Macmillan Company, 1942, p. 370.

4. Martin, H. E.: To be published.

various categories according to the limits of the disease at the time they were first seen in the hospital and not according to the suspected or projected anatomic location at their beginning. We feel that a tumor which began as an intrinsic growth and has extended to an extrinsic area should be classified as an extrinsic tumor and must be treated as one.

Many of the tumors were graded according to Broders classification. Salinger [5] feels after reviewing cases for 20 years that the choice of treatment selected on the grade of the tumor does not affect the prognosis. Cutler,[6] in a study of 300 cases, feels that grading is not the sole basis for determining radiosensitivity. Kernan [7] is also of this opinion and does not choose the type of treatment on the basis of the grade of the tumor. No attempt on our part to survey the grade of the tumor has been made. After seeing these reports of well selected and reviewed cases with few or no recent statistics to bear out the relation of radiosensitivity to grade, we felt that one could not base the type of therapy on the grade of the malignancy determined by microscopic appearance.

In two cases of the group the tumors were not classified as carcinoma. In the first a fibrosarcoma of the right vocal cord, entirely intrinsic, was operated on by laryngofissure and three years have passed without recurrence. In the other a

TABLE 2.—*Location and Extent of Carcinoma*

	No. of Cases
Intrinsic	17
Intrinsic with clinical metastasis	1
Extrinsic	11
Extrinsic with clinical metastasis	28
Subglottic	2
Carcinoma in situ	2

lymphosarcoma in a woman was removed by laryngofissure to control the bleeding following biopsy. Two years later there were metastatic lesions of the extremities, proved by biopsy, although the primary site, which had also been treated by x-rays, showed no appearance of recurrence. Clerf,[8] in a large series of cases, reports the ratio of the incidence of sarcoma to carcinoma as one in 92 cases, while Havens and Parkhill [9] report a ratio of one to 100. Our own series, while small, shows one case in 29, a much higher rate than the statistics quoted.

One will notice that there are two cases of carcinoma in situ included in this group. The original tissue taken definitely showed carcinoma, but subsequent examinations and study have shown no further progress in the disease and no clinical evidence of carcinoma. Although these cases have lasted only two or three years respectively, they must still be regarded with suspicion for a much longer period.

5. Salinger, S.: Radiation Therapy for Carcinoma of the Larynx: Observations After 20 Years, Arch. Otolaryng. **32**:887-902 (Nov.) 1940.

6. Cutler, M.: Cancer of Larynx: Relation Between Gross Anatomy, Microscopic Structure and Radiosensitivity, J. A. M. A. **115**:1339-1345 (Oct. 19) 1940.

7. Kernan, J. D.: Malignancies of the Larynx: Shall We Employ Surgery or Radiotherapy? M. Rec. **159**:351-352 (June) 1946.

8. Clerf, L. H.: Sarcoma of the Larynx: Report of 8 Cases, Tr. Am. Laryng. Rhin. & Otol. Soc. **50**:149-157, 1946.

9. Havens, F. Z., and Parkhill, E. M.: Tumors of the Larynx Other Than Squamous Cell Epithelioma, Arch. Otolaryng. **34**:1113-1122 (Dec.) 1941.

In our method of classifying the location and extent of the carcinoma, our figures show about one case of intrinsic to two of extrinsic. Schall [10] and Martin [11] in much larger series give about the same proportion of intrinsic to extrinsic carcinoma. Tucker,[12] however, in a review of 360 cases, found that 70 per cent of the tumors had an intrinsic origin. Blady and Chamberlain [13] also found about two thirds of the tumors to be intrinsic. Apparently all of them used the same extent for intrinsic and extrinsic tumors based on the projected location at the beginning. In reading these reports we have been unable to explain the difference in incidences.

In three of the group of tumors studied, carcinoma in a distant organ was found to be of another origin at autopsy.

The principal symptom in all this group was hoarseness, which was present for six months or longer in 35 cases. In 18 cases the hoarseness was present for three months or less, while in eight cases there were no symptoms of hoarseness. Pain was a not too common symptom but was present in 20 cases from one to four months before admission of the patient to the hospital.

Our laryngofissure group, while small, included the case of one patient with recurrence in the nodes of the neck without local recurrence. There was one death

TABLE 3.—*Type of Treatment Carried Out*

	Laryngofissure, No. of Cases	Laryngectomy, No. of Cases	Laryngectomy Plus Radical Neck Dissection, No. of Cases	Radical Neck Dissection After X-Ray, No. of Cases	X-Ray, No. of Cases	No Treatment, No. of Cases
Intrinsic	7	6	..	..	4	..
Intrinsic with cervical metastasis	..	1	..	..	..	..
Extrinsic	..	6	..	..	5	..
Extrinsic with cervical metastasis	..	4	4	2	13	6
Subglottic	..	2	..	..	2	..

due to other causes two years after surgery but with no evidence of recurrence at the time of death. Accepting this death, due to other causes, as a two year cure, our survival rate to date is about 85 per cent, or that in much larger series considered to be optimum.

Cunning [14] states that he believes treatment of early cord lesions will give as high a rate of cure with x-ray treatment as obtained with surgery and made a preliminary report. His series is small, and many patients have not reached the five year cure. Cutler [15] also is very definite in his belief that he can obtain as high a percentage of cures with x-ray therapy as the 85 per cent expected with surgery. At this particular time can we afford to rely on x-ray therapy for these early cord

10. Schall, L. A.: Cancer of the Larynx: Surgical Treatment, Am. J. Roentgenol. **46**:30-32 (July) 1941.

11. Martin, H. E.: Selection of Treatment for Cancer of the Larynx, Ann. Otol. Rhin. & Laryng. **49**:728-735 (Sept.) 1940.

12. Tucker, G.: Cancer of the Larynx: Diagnosis, Treatment, and Results, with Observations on Relation of Benign Tumors to Cancer, South. Surgeon **10**:671-679 (Sept.) 1941.

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lesions when laryngofissure is applicable? Unless the x-ray therapist can improve on this percentage, we probably would do better to continue with surgery. Unfortunately, this high percentage of cure cannot be demonstrated by every roentgenologist, and there must be more standardization of the amount and the portals of irradiation. The use of penicillin has reduced the mortality rate for laryngofissure to a bare minimum.

One must remember that in the period following Coutard's description in 1922, massive doses of x-ray have been used. Except for some changes in technique, there have been no great changes in the past 10 years, as there have been in surgery and modern management.

Prior to the introduction of penicillin, the surgical mortality rate, of course, at times made a great difference in the choice of treatment. There is no longer a mortality rate of such degree that surgery should be undertaken with fear. Our ability to combat shock and to control postoperative infection has placed the surgical mortality rate very low. In 29 cases in this group surgical procedures were carried out, and there were no deaths which might be classified as surgical.

In the group with intrinsic tumors there were only six patients who required laryngectomy, of whom three are still living and free of recurrence. The one patient with intrinsic carcinoma with metastasis had x-ray treatment to the metastatic neck lesion and has remained free of clinical symptoms for over two years. Of those with extrinsic carcinoma without clinical evidence of metastasis, there are only two living at present, one of whom, treated by x-ray, showed recurrence in less than two years and the other, on whom a laryngectomy was done, is free of disease after three years. In the extrinsic group with metastasis there were no cases of survival when treatment was limited to x-ray, laryngectomy or both. The only surviving patients after one year were two who had laryngectomy with radical neck dissection and two who had x-ray therapy of the primary side followed by radical neck dissection.

Those subjected to x-ray therapy in this series of course had advanced carcinoma and many were in poor physical condition, but the mortality was unusually high. Of the 61 patients reported, 21 are still living without clinical evidence of recurrence. There are three patients whose period of survival after treatment is under one year, eight are in the first year; four in the second year, three in the third year and three in the fourth year. We do not feel, however, that the report of these patients does justice to x-ray therapy.

In this series there were 21 patients who had only x-ray treatment and five who had x-ray treatment in combination with surgery. The only one who had complications thought to be due to x-rays had suspected transverse myelitis of the spinal cord, which could not be proved because autopsy was not permitted.

The trend among many laryngologists now is toward radical surgery in the advanced cases instead of x-ray therapy. Martin [4] reports that subjecting all his patients with intrinsic and extrinsic carcinoma with or without cervical metastasis to surgery had increased his five year survival rate from about 10 per cent of all patients treated to about 60 per cent. Salinger,[5] as far back as 1940, reviewed cases for 20 years and felt that surgery was very definitely superior to x-ray treatment.

Ogura [16] reports that in 28 cases in which a prophylactic radical neck dissection was done at the time of laryngectomy in cases in which no clinical evidence of

16. Ogura, J. H.: Unpublished data.

metastasis was found microscopic examination of the tissue outside the larynx revealed tumor cells in 20 per cent.

This review should stimulate us further to convince the public of the importance of evaluation of hoarseness. Many of the 35 of the 60 patients who had hoarseness six months or longer could have been spared the tragic end and much of the disabling treatment to which they were subjected. Many of these patients were seen late because of their ignorance of the importance of hoarseness.

We must be very cautious and deliberate in the selection of the type of treatment to recommend. Ample evidence has been submitted that in the hands of both surgeon and x-ray therapist good results can be obtained. We feel that in this series of cases surgery has offered the best results to date, although those in which surgery was used were the less advanced cases.

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FIFTY YEARS' PROGRESS IN SCIENTIFIC OTOLARYNGOLOGY

ALFRED LEWY, M.D.
CHICAGO

AN IMPORTANT step in scientific otolaryngology in the Midwest was taken when, in January, 1899, Dr. E. Fletcher Ingals invited a number of Chicago physicians to meet for the purpose of forming a society of specialists. The following doctors were present at what proved to be the organization of the Chicago Laryngological and Climatological Society, which later became the Chicago Laryngological and Otological Society: E. Fletcher Ingals, T. M. Hardie, H. G. Olds, H. M. Thomas, Norval H. Pierce, Arnold C. Klebs, F. Menge, M. R. Brown, E. T. Dickerman, W. L. Ballenger, J. A. Robison, A. M. Corwin, Otto Budde, G. Futterer, W. E. Casselberry, G. L. Morgenthau, G. E. Shambaugh Sr., J. H. Coulter, O. T. Freer, A. R. Solenberger, and J. E. Rhodes. At the first meeting, May 20, 1899, 10 members attended the session in the rooms of the Chicago Medical Society.

From this beginning the membership of our society has grown to about 65, with an average attendance at meetings of one hundred members and guests. From time to time otolaryngologists and other scientists of international reputation in related fields have been our guest speakers.

In the original name of the society you will notice no mention is made of the ear. Dr. Ingals himself specialized in diseases of the nose, throat, and chest, and a number of the physicians originally invited did no otological work. So far as I can learn, the elder Dr. Shambaugh was a pioneer in Chicago in research on the histology of the ear. This work was later taken up by other members of our society. In 1906, perhaps earlier, he was giving courses at the University of Chicago in the gross anatomy and histology of the nose, throat, and ear.

POSTGRADUATE EDUCATION

Scientific advance in medicine is made by research and discovery. The discovery may be accidental, but its recognition and application are dependent on previous knowledge, and this naturally leads to a consideration of medical education. As early as 1907 we find Dr. G. E. Shambaugh Sr. (quoted from his paper read before the Chicago Laryngological and Otological Society, March 1, 1920) recommending that preparation for special practice should include as thorough a grounding in the fundamental sciences as in clinical study and should be on a basis of genuine graduate work in a university, leading to a higher degree, e. g., that of Doctor of Philosophy in otology. Clinical and conference courses in rhinolaryngology were

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offered to general practitioners by Freer and Torrison, under the auspices of the University of Chicago, two hours daily during the spring quarter of 1903, but announcement of these courses does not appear in the catalog of the Rush Medical College for 1904. In the 1906 catalog there does appear a listing of a surgical course for advanced students and practitioners by Stubbs and Friedberg. In 1903, the College of Physicians and Surgeons of the University of Illinois scheduled a course in laryngology given by Ballenger, two hours a week for four months, and in 1914-1915 offered lectures by Beck, one hour a week for ten weeks; a clinic course, one hour a week for one semester, and one hour a week (optional) at the central free dispensary and at the Cook County Hospital. Lectures on otology were given by Pierce, one hour a week for six weeks, with four hours of clinic work, at the Illinois Eye and Ear Infirmary, in sections. In 1912 courses for physicians were given daily for thirty hours by Sluder and Sauer at Washington University, St. Louis. They were offered again in 1913, from 2 to 4 p. m. daily, duration not mentioned, fee $25. In 1915 it was announced that "graduate students may follow the work in clinics by special arrangement with the instructor."

The foundation of the first ear clinic in the world is generally credited to Adam Politzer, of Vienna, in 1873. Here many of the later renowned European otologists received their early training, as well as some Americans. As a matter of fact, Dr. Edward L. Holmes established in Chicago in 1858 an eye, ear, nose, and throat clinic, which was later taken over by the state as the Illinois Charitable Eye and Ear Infirmary. The original building by the state was erected in 1874 and is still in use for administration purposes. This was the first outpost in the Northwest for graduate training, and today, with its educational facilities under the administration of the University of Illinois, it is probably the peer of any such institution. Its living graduates today number about 350. The present requirements are a semester of graduate study in the basic sciences, followed by a year each of residency in otorhinolaryngology and in ophthalmology. It has been difficult to follow exactly the growth of graduate training in this country. In 1903 Dr. Harris P. Mosher (personal communication), on his return from Europe, started a graduate course at Harvard Medical School. (He said his men worked from 9 a. m. to 10 p. m., and that his graduates are prouder of that than of what they learned.) The course at Harvard is now eight months of basic sciences and 27 months' residency. Nevertheless, in those days it was generally considered that only European training carried prestige. Today, of course, this country leads the world in nearly all fields of medicine, although important research work in our specialty is going on in Holland and the Scandinavian countries, and excellent clinical work is being done in England.

In the early years of this century a general practitioner became a specialist in diseases of the ear, nose, and throat by announcement, or by having worked as an assistant in a clinic for a brief time. Relatively few took courses like that of Dr. Shambaugh, mentioned above. Of those who did, some really profited by it. One of my fellow students two weeks after completion of the course had already done several septal resections. By the end of the first decade of the century men like Dr. Fletcher and Dr. Robert Sonnenschein spent two or more years in European study, the first in Vienna and the second with Dr. Gerber in Königsberg. It was there that Dr. Sonnenschein did the work on which he based his erudite study of

the Schwabach test. Bone conduction is still being studied today. Parenthetically, our younger men, "raised on the audiometer," do not realize how much was learned diagnostically by the use of tuning forks. In spite of the preparation made by some of the men, Dr. L. W. Dean reported that at Camp Greenleaf, Ga., during World War I, 70 per cent of the Army otolaryngologists were incompetent. What a difference today! The well trained otolaryngologist, when he finally does start on his own, really may earn a living from the beginning and includes in his work head and neck surgery and endoscopy.

An important factor in the advance of surgery and in hospital standardization has been the American College of Surgeons, which graduated its first "class" in 1913. In 1916 the American Academy of Ophthalmology and Oto-Laryngology appointed a committee, consisting of Thomas E. Carmody, Harris P. Mosher, and Ross Hall Skillern to examine candidates in otolaryngology. In 1924, through the efforts of the senior Dr. Shambaugh, the committee was enlarged to include representatives from the other otolaryngologic societies, and thus was born the American Board of Otolaryngology, which has done so much to bring about modern practice. In 1927 (*J. A. M. A.* **89:** 335 [July 30] 1927) Dr. George M. Coates, writing on training in otolaryngology, said that postgraduate work is only the beginning of study that continues till death or retirement. Although there are now many graduate courses in otolaryngology in this country, the American Medical Association's 1935 list of hospitals approved for residencies in the specialties makes no reference to any for otolaryngology alone, although Kings County Hospital, Brooklyn, is approved for plastic surgery.

Through the efforts of Dr. Joseph C. Beck, and under the auspices of the Academy of Ophthalmology and Oto-Laryngology, in 1937 (*J. A. M. A.* **108:** 1187 [April 3] 1937) pathological otolaryngologic specimens from the Army Medical Museum, Washington, D. C., became available to students and doctors. Since 1940 the Academy offered home-study courses to prospective members.

The most modern dramatic advance in education, all the possibilities of which we can hardly imagine at this time, is television in color. Sitting in the Stevens Hotel, watching in beautiful detail operations being done in St. Luke's Hospital, I could not help thinking: Will we take our postgraduate instruction in surgical procedure sitting at home in an easy chair? Telephonic broadcasts of lectures and round-table discussions have already been instituted by the dental department of the University of Illinois.

CLINICAL ADVANCES

At this point I should like to digress briefly to report a part of a meeting of our society in 1900, illustrative of clinical acumen without modern laboratory aid. Dr. T. M. Hardie presented a case of trauma of the nose in a woman who had had a hysterectomy for cancer. The trauma was followed by swelling and, a month later, by a red, then bluish, small ulcer, discharging mucopus, healing and reopening several times, with crust formation and nodular bodies beneath the skin. His diagnosis was syphilis and was supported by Dr. J. Holinger on the history of one miscarriage and the death of another child at 15 mo., who at the time weighed only 11 lb. (4,990 gm.). The description of the Wassermann test was not published until 1906 (Wassermann, Neisser, and Bruck: *Deutsche med. Wchnschr.* **32:** 745 [July] 1906). I remember a story of a doctor who had Dr. Ingals in consultation.

on an obscure case. Dr. Ingals' diagnosis was syphilis. On being asked his reasons, he replied, "Did you not observe the army button on his lapel?" Today this would probably work in reverse.

Roentgenology.—In 1900 the photographic use of x-rays was known, having been discovered by Roentgen in 1895. The first therapeutic application thereof in this country, according to the records of the Radiologic Society of North America, was by Dr. Emil H. Grubbé, of Chicago, in 1896, but his report was not published till 1898; he treated cancer of the breast in a patient of Dr. R. Ludlam. Dr. Grubbé is still living and, like most pioneers in x-ray therapy, is suffering from the results of overexposure. The first European record of its therapeutic use was for epilation in naevus pilosus, by Leopold Freund, of Vienna, in 1896 (*Wien. med. Wchnschr.* **47**:428, 1897). In 1898 radium chloride was isolated by the Curies, and its therapeutic application is largely credited to Henri Dominici, an Englishman of Corsican descent, during 1906 to 1919. What these events have meant in diagnostic and therapeutic aid is known to all of you.

Surgery.—Many operations for straightening the nasal septum have been devised over the years, most of them involving fracture, excision, removal of spurs, ridges, etc., but the operation was finally perfected, if I may use the term, by Robert Kreig in 1889 and Otto T. Freer (1903), a charter member of our society, whose submucus resection technic is the basis of the modern operation. From this has grown the field of reconstructive surgery of the nose, for which we have to compete with the plastic surgeons. However, the high development of surgery in this region was largely contributed by otorhinolaryngologic specialists, who are also advancing into head and neck surgery, the regional anatomy of which they are more familiar with than are surgical specialists whose field is more widespread.

It is interesting to note here that in a textbook on diseases of the nose and throat, written in 1899 by D. Braden Kyle, Clinical Professor of Rhinology and Laryngology, Jefferson Medical College, Philadelphia, the chapter on laryngectomy was written by W. W. Keen, a general surgeon. However, F. H. Bosworth's book, written a few years earlier, describes this operation as presumably done by himself. P. D. Kerrison in the preface to his "Diseases of the Ear," 1913, stated:

> Probably in no branch of medicine have more notable advances been achieved during the past decade than in otology. . . . In aural surgery our activities can no longer be confined to the narrow limits of the tympanum and mastoid process, but must include the more hazardous field of intracranial surgery, and the yet more delicate and difficult work upon the auditory labyrinth itself.

The mastoid operation, simple and radical, and its modifications had reached a high degree of efficiency at the beginning of the century, as had the diagnosis and preventive surgery of intracranial complications. This knowledge and skill have continued to advance, although the frequency of surgical intervention has been greatly reduced by the discovery and use of antibiotics. But, while enormous strides have been made in the control of the acute and some chronic infections, we now see more frequently than before masked chronic infections in which the manifest acute symptoms have been controlled by antibiotics prescribed by the nonspecialist, but which lapsed into smoldering chronicity with loss of function. We have already experienced streptomycin-fast, penicillin-fast, and other resistant strains of our more familiar bacterial enemies. What the future will bring we do not know, and

we must remember that our present antibiotic standbys have not yet weathered any large epidemics. These remarks also apply to the antiviral and antirickettsial agents.

The greatest advance in otological surgery of our half century is in the treatment of otosclerosis and perhaps chronic adhesive deafness. About 1916 G. Holmgren began working on the idea of fenestration for the relief of progressive deafness. In 1924 Maurice Sourdille began on his three-stage operation. A report of this was published in 1937 (*Ztschr. f. Hals-, Nasen- u. Ohrenh.* **40:** 514, 1937). In 1923 Holmgren reported four cases in which he had performed a fenestration near the oval window, but the operation was never done on a large scale until Julius Lempert (ARCH. OTOLARYNG. **28:**42 [July] 1938) published a report of 23 cases in which he had done a fenestration of the external semicircular canal in a one-stage operation by his endaural approach. His technic has been generally accepted with a few individual variations. The statistical reports on its permanent success vary considerably, but incidence of cure is stated by Holmgren to be 50 per cent or better. In the meantime, the manufacturers of hearing aids have made tremendous advances in the efficiency and availability (except as to cost) of electric hearing aids. The advent of fenestration has also brought with it more careful surgery of the ear in general, with better conservation of hearing in the various modifications of the mastoid operation, when this becomes necessary.

Functional Tests of Hearing.—The Edelmann tuning forks and whistles, comprising the range of human hearing, were officially presented to the profession by Friedrich Bezold in 1890, according to his textbook which was translated into English by Dr. J. Holinger, one of our charter members, in 1908. These tests are standard today and very valuable in diagnosis to those who are familiar with the technic of their use. If calibrated forks are used, so that their decrement is known, they serve as a useful record. Most doctors today use the audiometer. The first audiometer in practical use in this country was the pitch-range audiometer of C. C. Bunch (1919), with the cooperation of Prof. C. E. Seashore, psychologist at the University of Iowa, and Dr. L. W. Dean, head of the otolaryngologic department. The modern instrument, equipped to deliver any pitch within the hearing range at measured intensities, the whisper, the voice, and bone conduction, although this not yet accurately, and to catch malingerers, seems to be an additional necessity. Volumes have been written on its application in diagnosis, one of the latest being determination of the type of impedance present. It has also been applied in mass screening of schoolchildren for the early detection of poor hearing.

OTONEUROLOGY

Otoneurology, based on the investigation of the eighth nerve by J. M. P. Flourens (1824), Josef Breuer, E. Mach, A. Crum Brown, and Ewald (1902), found its clinical application in the work of Robert Bárány (1906). Today it is still almost a specialty within our specialty and should be more widely understood by all otologists, who would thereby increase their usefulness in neurological problems, including the finding of the presence or absence of objective evidence of dizziness, an important contribution in medicolegal cases involving head injury.

Mention should also be made of a few more men outside our specialty whose contributions thereto were of great value: Prentiss, Batson, Pohlman, Larsell, Anson, and Bast, anatomists; Wegel, Fletcher, and Guild, acoustic physicists;

Tait, Magnus and De Klejn, Wever and Bray, Saul, Davis, and Culler and Dworkin, physiologists working with practicing otologists. In May, 1930, Wever and Bray (*Proc. Nat. Acad. Sc.* **16:** 344 [May] 1930) published their experiment of taking electric potentials from the cat's cochlea by an electrode touching the brain stem, carrying them to an amplifier in an adjoining room, where the words spoken into the cat's ear could be heard. Wever based his "volley theory" of hearing on this work. Culler and Dworkin used the conditioned-reflex method of determining hearing in animals. In 1929 the American Otological Society issued the first volume of three on otosclerosis, pursuant to a plan presented by Dr. Arthur B. Duel, of New York. Four years before, the Carnegie Foundation had granted a subsidy of $90,000 for this purpose. The first committee in charge consisted of Dr. Norval Pierce, Dr. George E. Shambaugh Sr., and Dr. J. Gordon Wilson, of our society; Dr. Eugene A. Crockett, of Boston, and Dr. Duel.

REHABILITATION

Along with the development of the audiometer came the development of the modern vacuum-tube hearing aid, the greatest mechanical factor in rehabilitation of the deaf. In the early part of the century Europe was far ahead of us in schools for the deaf. The Volta School, or at least *The Volta Review,* was probably instigated by Alexander Graham Bell. Its first issue appeared in 1894. In 1914 the Central Institute for the Deaf, in St. Louis, founded by Dr. Max Goldstein, was teaching lipreading as opposed to the sign language, which had for long been the accepted method of putting the deaf in touch with each other and with the outside world. At first there was much controversy about which was more practical, and it was common even for those who learned lipreading to drop back to the sign-language method. Dr. G. E. Shambaugh Sr. supervised an investigation of defective hearing in the public schools in Chicago, and in 1931 our society initiated an attempt to screen schoolchildren with poor hearing and follow up with recommendations for treatment. The schools had only one audiometer, so we, without funds, resorted to the whisper test. Our effort, for which a dozen of our members volunteered their services, resulted in the appointment by Dr. Bogan, then superintendent of schools, of a committee for a general health survey, consisting of representatives of all branches of medicine; but with his retirement the plan was discontinued. The Chicago Department of Health has had medical inspectors in the schools since 1900. Later the Works Progress Administration conducted screening tests in the schools of 62 counties of the state, under the supervision of one of our members. Recently a survey was made of Will County, Illinois, schools, with definite diagnoses and treatment by cooperating otologists, also under the supervision of one of our members.

As you know, the state now has two fully equipped rehabilitation centers for persons with hearing and speech defects: the Illinois Eye and Ear Infirmary, under the supervision of the University of Illinois, and Northwestern University School of Speech. There is a long history of resolutions by national and local medical societies preceding these accomplishments. The first school in Chicago was a private one established by Miss McCowen about 1893. This school was absorbed into the public school system about 1896, when Miss McCowen began training teachers of the deaf, one of whom was Miss Clara Newlee, who began at the Parker School in

1906, and to whose school one of our members was medical adviser. The greatest impetus in this work came during World War II, when the large rehabilitation centers at Deshon, Chickasha and Santa Barbara for the Army, and at Philadelphia for the Navy, went into action. In the last of these one of our members won his laurels. Others are continuing the good work in Veterans Administration hospitals.

ENDOSCOPY

The development of endoscopy has usually been attributed to Killian, but Kussmaul in 1868 used the urethroscope to examine the lumen of the esophagus; Kirstein in 1896 introduced direct laryngoscopy, which he termed autoscopy, and in 1902 von Hacker inserted a rigid tube into the trachea. Suspension laryngoscopy, leaving both hands free, was originated by Killian in 1911 and was later improved by Lynch, Haslinger, Seifert, and others. The universal use of endoscopy in the respiratory tract and esophagus was stimulated by Chevalier Jackson, with his distally illuminated instruments using suction and having a right-angle handle, which he devised through years of work, privation, and struggle with his enemy, tuberculosis, of which he had three exacerbations during his lifetime. He mentions in his biography that 95% of his patients were charity patients, and that he often worked 17 hours a day. On March 7, 1905, Dr. Ingals removed a collar button from the bronchus, which was perhaps the first instance on record in Chicago, but the endoscopic work was soon taken over by his associate, Dr. Stanton Friedberg Sr. I remember in one of his talks Dr. Friedberg corroborated Dr. Jackson's statement about charity patients: "The endoscopist is lucky if he is permitted to keep the penny he removed from the esophagus." The modern endoscopists are smarter. Today our society boasts several endoscopists who are widely known, and Chicago is a training center. The American Broncho-Esophagological Association was founded in 1919, originally as the Association of American Endoscopists.

ALLERGY

Allergy has an ancient history, by perhaps another name. In the first century before Christ Lucretius wrote "One man's meat is another man's poison," and the Babylonian Talmud, second century after Christ, tells how to combat intestinal egg sensitivity. Galen (A. D. 129?-200) was aware of sensitivity to goat's milk. Richet in 1898 sensitized animals to extract from the sea anemone and called the resulting phenomenon anaphylaxis. In 1903 von Pirquet and others showed that small doses of antigens produced temporary insensitivity. In 1910 Scheppegrell, of New Orleans, advised the smelling of ragweed early in the season to prevent hay fever, and by 1911 Noon and Freeman treated it with intracutaneous injections. Following came experimental sensitization of the skin with chemical substances by Block, Sulzberger, and Landsteiner, and of the bronchial mucosa with inhalants by Ancona, Von Leeuven, and Busson. Meltzer, in 1910, expressed the idea that asthma was an anaphylactic disease, and in 1925 Duke grouped sensitivity to light, heat, cold, and pressure as physical allergy. At one meeting of our society a biopsy specimen precipitated a hectic controversy between two members on the relation of allergy to hyperesthetic rhinitis, a subject on which one of them had written. Today allergy has grown beyond our bounds into a specialty of its own, supporting its own special

society in Chicago and other cities. While the diagnosis of allergy has made great strides, curative treatment has not kept pace, except for avoidance of the allergen if discovered. Antihistaminic agents have been found to afford some relief.

ANTIBIOTICS

When in 1929 Sir William Fleming discovered lysis surrounding a small nidus of Penicillium notatum in his Staphylococcus culture plate, he recognized its possibilities, although it was not until after about ten years of research that Chain and Florey demonstrated clinically, with purified extracts of penicillin, its antibacterial properties. In 1910 Ehrlich and Hata gave "salvarsan" (606; arsphenamine) to the world as the *"therapia magna sterilisans"* for syphilis, but other general infections were uncontrolled. A diagnosis of hemolytic Streptococcus, Pneumococcus, or any other type of otogenic or rhinogenic meningitis in which viable organisms could be cultured from the spinal fluid was tantamount to a death warrant in nearly all cases. Preparations of iodine, mercurials, arsenic, octylhydrocuprein dihydrochloride (vuzin®), and other drugs, and Kubie's through-and-through drainage of the cerebrospinal fluid and drainage of the cisterna pontis lateralis yielded an occasional cure, but our main hope was in the early recognition of the intracranial threat, and intelligent and prompt preventive surgical treatment, neither too early nor too late, neither too little nor too much. It was some time after the beginning of the century that the roentgenogram became a useful adjunct in our indications for surgical intervention. In 1935 prontosil® was introduced, followed in 1937 by sulfanilamide and sulfapyridine. (I well remember our first case of hemolytic Streptococcus infection at Cook County Hospital for which we obtained sulfonamide treatment. A girl 9 yr. old had a discharging right ear with total deafness of the left ear. The ear was dry, although a paracentesis had been done. We performed a simple mastoidectomy on the right, uncovering the dura widely; the left ear, mastoid spaces, and labyrinth contained no pus. I saw that patient a year ago in good health.) We soon learned that the sulfonamide drugs could mask the clinical and even the roentgenographic picture, besides having serious side effects, such as anuria, hematuria, and agranulocytosis, and as each new preparation appeared so eventually did its dangers.

These epoch-making advances in medical therapeutics have tremendously reduced the need for dramatic major surgical procedures in preventing the spread of infection, but the judgment of the trained and experienced specialist is more than ever needed to preserve function and health. More frequently than before we now see masked chronic infections in which the acute symptoms appear to have been controlled by antibiotics prescribed by the nonspecialist.

UNSOLVED PROBLEMS

As late as 1937, Dr. Harris P. Mosher listed unsolved problems in our specialty. Included were chronic infections of the nasal and pharyngeal mucous membranes, focal infections, anaphylaxis and allergy, cancer of the esophagus, osteomyelitis of the frontal bone, orbital abscess, radical operation on the frontal sinus, atrophic rhinitis, lung abscess, bronchiectasis, cavernous sinus thrombosis, chronic progressive deafness, otosclerosis, Ménière's syndrome, brain abscess, and meningitis. I think we can claim today definite improvement in the management, or alleviation at least,

of allergy, cancer of the esophagus, lung abscess, bronchiectasis, acute tracheobronchitis, cavernous sinus thrombosis, otosclerosis, Ménière's syndrome, and meningitis.

I should like to add that the management of acute tracheobronchitis and of bulbar poliomyelitis has been infinitely bettered through the efforts of one of our members.

OUTSTANDING CONTRIBUTIONS

Many other outstanding contributions have been made by present members. They were not all published through our society, and I have only a scattered list:

Four books by various members and contributions to books by several.

Yearly reviews of the literature of several branches of our specialty by at least six different members.

Prize awards to one for work on nasal secretions; to another for an essay on the control of pain.

Diagnosis and reports of the first two cases of agranulocytosis (first described by Versé and Schultz) in this community by two members (ulceromembranous angina had been previously reported by Dr. Ira Frank, but not clinically classified).

Studies of special anatomy of the paranasal sinuses.

Demonstration in color motion photography of laryngeal, tracheal, and esophageal anatomy, physiology, and pathology, and of the middle ear in action.

The inclusion of hearing tests in the municipal investigations in two cities on fluorinated drinking water, primarily intended for dental health study, by four members.

Studies of histopathology of Ménière's disease.

Voluntary service by 12 members in the public school study of deafness.

Supervision of the Works Progress Administration study of hearing conditions in the schools of 62 counties of Illinois by one member.

Supervision by one member of a study of hearing conditions in the schools of an Illinois county, with follow-up treatment by cooperating otologists.

Participation in a projected survey in Cook County, Illinois.

I hope to be forgiven for the many omissions and for scant notice accorded some items. Particularly does this apply to important contributions made by living members of our society whom I have purposely tried to avoid mentioning by name because I could not include them all.

Case Reports

BRAIN ABSCESS OF FRONTAL LOBE COMPLICATING PANSINUSITIS

Report of a Case with Operation and Recovery

BENJAMIN H. SHUSTER, M.D.
CLARENCE D. HINTON, M.D.
AND
ALLAN R. SHUSTER, M.D.
PHILADELPHIA

AN UNUSUAL case of pansinusitis with rapid onset of intracranial complications, with operation and recovery, was recently observed. A report is presented to show the importance of the clinical neurological manifestations and the value of conservative postoperative care in a case of this type.

REPORT OF CASE

C. W., a 16-yr.-old Negro boy, was admitted to the Philadelphia General Hospital, to the ear, nose, and throat service of one of us (B. H. S.), on Feb. 14, 1951. Three days prior to his admission, he awoke with an obstructed nose, frontal headache, and malaise. These symptoms became progressively worse, and, in addition, his left upper eyelid became discolored and began to swell. Because of the ocular disturbance, he first went to an eye hospital, where he was examined and referred to this hospital.

There had been no recent ill health. The patient had had measles, chickenpox, and pneumonia during his childhood.

On admission the temperature was 102 F., the pulse rate, 90 per minute, the respiratory rate, 20 per minute, and the blood pressure, 118/80. The mucosa of both nasal cavities was inflamed; a purulent discharge was present in the left middle meatus, and a distinctly purulent postnasal discharge was seen. There was definite tenderness on palpation of the left supraorbital region. The left upper eyelid was edematous, darkly discolored, and completely closed. Transillumination revealed opacity of the left frontal and left maxillary sinuses. The results of the remainder of the physical examination were essentially normal.

Laboratory findings were as follows: The hemoglobin concentration was 13.9 gm. per 100 cc., and the white blood cell count, 5,950, with 82% polymorphonuclear forms. The urine contained a trace of albumin and one to three granular casts per high power field. A photofluorogram of the chest showed nothing abnormal. Roentgenograms of the paranasal sinuses revealed a haziness of all sinuses on the left. These observations led to a diagnosis of acute left pansinusitis, but it was apparent that the main pathological involvement was in the frontal sinus.

Several small incisions were made through the skin of the left upper eyelid to help decrease the edema. The patient was confined to bed and given 200,000 units of crystalline penicillin every three hours. Hot boric-acid compresses were applied to the eye, and codeine was given to relieve the pain. He continued to be restless and in pain the next day. The swelling of his eyelid became fluctuant, necessitating incision and drainage on Feb. 17. During the night he removed the drain because he was having severe pain. The following morning, as he walked to the treatment room, he was noticed to have a distinct drop of his right foot. His temperature rose to 102 F., and his headaches were quite severe. These signs suggested the development of an intracranial complication. The leukocyte count was repeated and was 11,500, with 79% polymorphonuclear cells. The spinal fluid had a pressure of 300 mm. of water, was slightly cloudy, and contained 127 white blood cells, with a differential count of 57% polymorphonuclear forms and 43% lymphocytes.

When the patient was seen in consultation by the neurologist, a pronounced foot drop on the right side and an ataxic gait, with a tendency to fall to the right, were noticed. There was slight motor weakness of the right lower extremity. The biceps and patellar reflexes were absent bilaterally, and there was definite nuchal rigidity, but no Kernig or Brudzinski sign was elicited. Funduscopic examination gave negative results.

An operation was performed immediately (C. D. H.). With the patient under general endotracheal anesthesia, the left frontal sinus was opened, using a modified Lothrop technique. Pus was seen to come from a space between the floor of the frontal sinus and the orbital periosteum. An unsuccessful attempt was made to follow this pus to its point of origin. We could demonstrate no eroded area, dehiscence, or fistulous tract in the bony walls of the left frontal sinus. In fact, not enough pathological involvement was seen in this sinus to account for the patient's clinical condition. Therefore, a decision was made to remove a part of the posterior

Roentgenogram showing sterile wires within rubber tubes to indicate insertion into brain abscess cavity.

wall of the left frontal sinus. Immediately on doing this, an area of extradural pus was encountered. This was removed by aspiration. The dura was under tension; therefore, it was incised, revealing a subdural collection of pus. This, too, was removed by aspiration. The underlying frontal lobe of the brain was then probed in two places for a depth of about ¼ in. (0.64 cm.). Pus was recovered from one of these areas. A rubber drain was then inserted into the abscess cavity and another placed under the floor of the sinus just above the orbital periosteum. The edges of the incision were kept apart with iodoform gauze. A window was then made in the left maxillary sinus through the inferior meatus.

There was a noticeable improvement in the patient's condition immediately after the operation. A culture of the pus obtained from the abscesses failed to reveal the presence of any organisms. Two days following the operation he displayed a mild motor aphasia and inability

to flex the right leg. This later developed into complete paralysis of the right leg, followed by paralysis of the entire right upper extremity. His temperature began to rise again, in spite of aureomycin and penicillin therapy. The peak of this temperature rise was accompanied with a convulsion involving the entire right side of his body. Amobarbital (amytal®) sodium, 7½ grains (0.5 gm.), diluted with distilled water was given intravenously to control the convulsion. Because of the development of these symptoms, it seemed apparent that another collection of pus had formed.

With sterile precautions, the incision was reopened at the patient's bedside and an encapsulated area of pus opened and drained. Two noncollapsible rubber tubes were inserted into the cavity as drains and to serve as a means of instilling crystalline penicillin solution directly into the abscess cavity. The incision was again left open, with iodoform gauze separating the edges.

On the following day another convulsion developed. This was again controlled by the administration of 7½ grains of amobarbital sodium intravenously. The patient was maintained on diphenylhydantoin (dilantin®) sodium and phenobarbital given orally for three weeks. There were no subsequent convulsions. The incision was dressed daily, and crystalline penicillin solution, 300,000 units, was instilled into the abscess cavity at each dressing. The drainage tubes were left in place until granulation tissue in the cavity pushed them completely out, approximately six weeks from the date of admission. Within five days after the bedside drainage was instituted, the aphasia disappeared and the function of the right arm and leg returned. The foot drop persisted and required application of a posterior mold for three weeks to maintain the foot at the proper angle. On removal of the mold, the function of the ankle and foot had returned completely. The temperature gradually leveled off to normal after rising daily to approximately 100 F. for two weeks. The patient was allowed out of bed after the temperature remained at a normal level for three days. His convalescence was uneventful from that point to the time of his discharge.

COMMENT

The following are the interesting facts in connection with this case:

1. The rapid onset of intracranial complications shortly after the appearance of a pansinusitis without visible extension from the frontal and ethmoid sinuses into the brain and orbit was unusual. Invasion probably took place by way of thrombotic venules. Unfortunately, a growth of the organism could not be obtained.

2. The decision to explore the brain was made on the basis of clinical neurological findings, not too well marked, in spite of a solid, firm posterior wall of the frontal sinus. This suggests that cautious hesitancy, because of lack of local softening of bone, may have failed to lead to the discovery of the pathological condition until after much needless delay. Even though the clinical signs are moderate, it is safer to search at the risk of not locating trouble than to delay until the disease is too far advanced. It is of value to the otolaryngologist to acquaint himself with the essential neurological manifestations around the regions where invasion from otolaryngeal sources may take place.

3. Postoperative care, with a full measure of antibiotic therapy, should be carried out conservatively with caution. Too radical excisions or rough handling of the brain is more likely to add to the complications than minimal manipulation with assurance that the abscess is properly drained. A tube in the brain or other form of drain should be left in place for weeks, and its frequent removal and reinsertion should be avoided, if possible. Local instillation of penicillin may be of some value, although much of it leaks out right after instillation.

Philadelphia General Hospital.

RECONSTRUCTION OF THE ORBITAL FLOOR USING STAINLESS STEEL WIRE MESH

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HARRY R. MORSE, M.D.
AND
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IN VIEW of the recent reports of the use of tantalum wire mesh for reparative work and more recently the original work of Jonas [1] concerning the use of alloy stainless steel wire mesh,[2] we should like to report a case in which we used stainless steel wire mesh to repair a defect in the orbital floor for support of the orbital contents.

REPORT OF A CASE

The patient was a 59 year old Negro woman who was first seen in the ear, nose and throat clinic. Her chief complaint was pain over the left antrum which extended over the bridge of the nose. The pain began in November 1949, with an upper respiratory infection. Prior to this date the patient was perfectly well. The discomfort at first was not severe and occurred intermittently at night. Gradually the pain became severer, and in January 1950, a definite swelling was noticed, which was very tender on palpation. It was treated by cold applications, with some relief. Late in January increasing nasal obstruction was noted on the left side accompanied with profuse purulent nasal discharge. Two weeks prior to her clinic visit, the patient complained that she had very marked and severe throbbing headaches over the left frontal area. These were accompanied with lacrimation of the left eye and diplopia.

The past medical, family and social history was essentially normal.

Examination revealed a marked soft tissue swelling over the left antrum extending over the bridge of the nose and toward the malar bone. The area was firm and had an irregular surface, but the skin was freely movable over the mass. There was no fluctuation or local heat, but definite tenderness was present. Intranasal inspection revealed a fulness and edema of the lateral nasal wall on the left side, so that the nasal airway was narrowed. The mucosa was normal in appearance, and no pathological tissue could be seen. The hard palate was normal in appearance as well as on palpation. A soft tissue mass could be palpated in the buccogingival fold. There were no palpable cervical or other nodes.

Ophthalmological examination showed the extraocular muscles to have normal function, and there was no evidence of an intraocular tumor. The rest of the results of the physical examination were essentially normal.

X-ray examination of the paranasal sinuses revealed a large soft tissue swelling over the left antrum, with clouding of the sinus and breakdown of the midportion of the roof of the antrum. A faint irregular calcification in this region was present, and it was felt that this represented a sequestrum. The left frontal and ethmoid sinuses were also hazy, suggesting retained secretions secondary to blocked drainage.

It was decided that an operation should be performed. A horizontal incision was made beginning with the outer canthus of the eye following the infraorbital ridge, and a vertical incision

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From the Department of Otorhinology and Rhinoplasty, Temple University School of Medicine.

1. Jonas, K.: Stainless Steel Cloth as an Internal Prosthesis, Arch. Surg. **60**:1205 (June) 1950.

2. Stainless steel wire mesh may be obtained from W. S. Tyler Company, Cleveland.

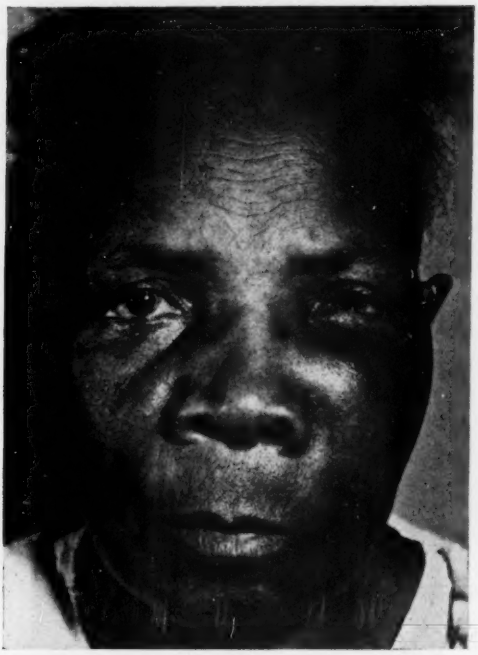

Fig. 1.—Preoperative photograph showing the soft tissue swelling over the left antrum and the elevation of the left orbit.

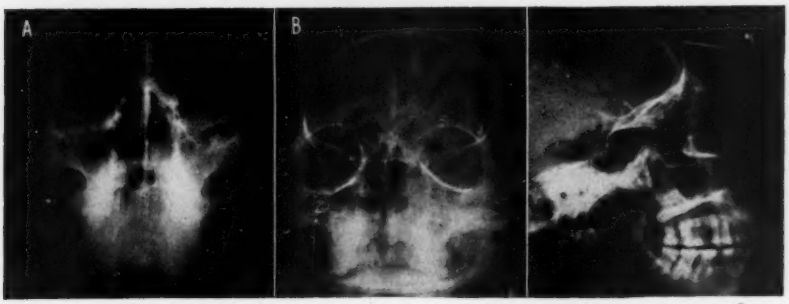

Fig. 2.—*A*, preoperative roentgenogram showing the soft tissue swelling over the antrum. The film also demonstrates the haziness of the antrum and frontal and ethmoid sinuses on the left side. There is obvious bony destruction of the orbital floor. *B*, postoperative views showing the wire mesh in place in the orbit.

was then extended from the inner canthus of the eye paranasally to the crease of the ala. This contour was followed by another incision to the filtrum, and the lip was then bisected at this point. A buccogingival incision was made to mobilize the entire cheek. The flap and mucous membrane were gradually lifted until the entire canine fossa was exposed. Bleeding was controlled by electrocoagulation and ligatures. The floor of the orbit was destroyed by pressure erosion, but there appeared to be no gross tumor involving the globe itself. The anterior wall of the antrum was completely eroded by tumor, and a large tumor mass extended into the soft

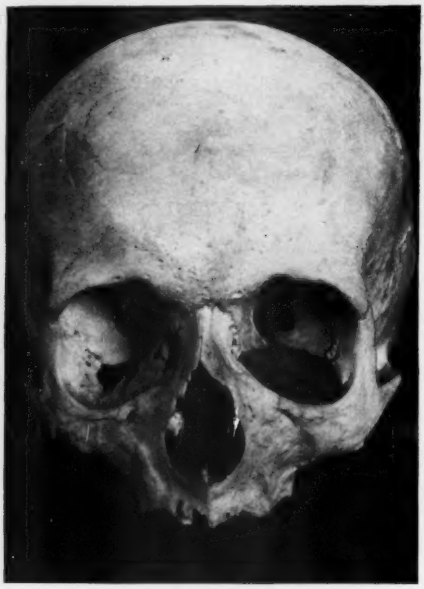

Fig. 3.—Skull with a similar piece of mesh molded into the floor of the orbit to demonstrate the adaptability of the stainless steel mesh for reconstructive purposes in maxillofacial surgery.

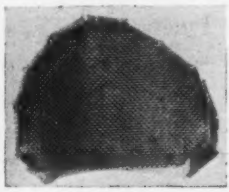

Fig. 4.—The same piece of mesh before insertion into the orbit.

tissues of the cheek. The tumor was resected from the skin covering the area, and in no area was there gross tumor invading the skin or immediate subcutaneous tissue. The anterior wall of the canine fossa was removed with a large rongeur, and the tumor inside the antrum was delivered readily from the sinus. A large amount of purulent material was present. The medial wall of the antrum was then removed, including the inferior turbinate. The anterior and posterior ethmoid cells were removed transantrally through the Denker route. About 0.5 cm. of the orbital floor was found to be destroyed, but the globe was apparently uninvolved. A piece of no. 60 wire mesh 7 by 15 cm. was folded on itself and cut roughly into a semilunar shape approximately 3.5

by 3 cm. The edges were folded under along the borders, and a piece 3 cm. in width and 2.5 cm. in length resulted. The eyeball was elevated from the floor of the orbit, and the wire mesh was inserted to fill in the defect. Bleeding was controlled with absorbable gelatin sponge U. S. P. (gelfoam®), and a light petrolatum packing was placed in the antrum. The skin incision was closed with no. 35 steel wire, and the mucous membrane was closed with colored surgical silk.

The postoperative course was uneventful. The patient experienced no diplopia. The ophthalmologist found the ocular rotations to be normal. There was no enophthalmos or depression of the globe. In view of the histological report of undifferentiated carcinoma, a course of postoperative irradiation was instituted which was administered through a lead shield, with a portal cut out so that the irradiation would include the malar area, cross the midline of the nose and extend superiorly to the glabella.

COMMENT

We do not present this as a cancer cure but only as an example in which excellent palliation was achieved and also as a case in which a wire mesh of stainless steel served very admirably as a prosthesis for the floor of the orbit.

PRIMARY AURAL CHOLESTEATOMA

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THE PURPOSE of this paper is to present the conflicting views concerning the origin of aural cholesteatoma and to direct attention to the premise that this lesion may have a single cause. It seems plausible to attempt to combine the various types of this lesion under one grouping. Why have different explanations for a pathological process which may clinically manifest itself in various forms? However, it is essential to explain how a tumor composed of stratified epithelial cell elements can arise in a cavity lined by columnar epithelium.

Cholesteatoma, incidentally a poor term, literally means a tumor of bile and fat. It was first used by Müller in 1838 when he discovered the laminated appearance of the cholesterin-containing cyst. Several years previously, the lesion was originally described by Cruveilheir,[1] who called it a "pearl tumor." Virchow in 1855 felt that these growths were congenital in nature and due to some developmental anomaly. Mickulicz in 1879 strongly supported this point of view. Cholesteatomas have been found at the base of the brain and in the testis, ovary, bone marrow, cecum, maxillary antrum, urinary tract, gallbladder, breast and uterus.

Gruber in 1862 and von Tröltsch in 1868 were the first to suggest that cholesteatomas were not tumors but were secondary to infection. Both men were otologists, and their approach was primarily clinical. Habermann and Bezold,[2] in the latter part of the nineteenth century, further demonstrated histologically, in the presence of suppuration, the invasion of the middle ear via a drum membrane perforation by the squamous epithelium of the external auditory canal.

Two principal types of cholesteatoma are found in the middle ear and adjacent bony cavities. The first is the one most commonly and frequently seen by the otologist. It consists of a moist, irregular, amorphous mass without any apparent capsule and contains epithelial cells, fat, granulation tissue, bacteria and cholesterin crytals. A perforation in Shrapnell's membrane is always present. The second may be dry and compact, with a definite capsule, and may or may not possess a mother-of-pearl sheen. It may or may not contain cholesterin crystals and is composed of squamous epithelium resting on a connective tissue base. On the surface of the cell layer, the squamae are usually present. It is not improbable that the dry tumor could be transformed into an amorphous one by actual suppuration or by sapro-

From the Department of Otolaryngology, Albany Medical College.

Candidate's thesis presented to the American Laryngological, Rhinological and Otological Society, Inc.

1. Cruveilheir, J.: Anatomie pathologique du corps humaine, Paris, J. B. Ballière, 1829, book 2, plate 6.

2. Habermann, J.: Zur Entstehung des Cholestatomes des Mittelohrs (Cysten in der Schleimhaut der Paukenhöhle, Atrophie der Nerven in der Schnecke), Arch. Ohrenh. **27**:42, 1888. Bezold: Cholesteatom, Perforation der Membrana flaccida shrapnelli und Tubenverschluss, Ztschr. Ohrenh. u. Krankh. Luftwege **20**:5, 1890.

phytic bacteria plus moisture. This transformation could be accomplished by a break in the continuity of the cyst wall. A perforation in the ear drum membrane may or may not be associated with the cyst.

Two main theories are propounded concerning the origin of aural cholesteatoma: (1) it is a primary, or true, tumor, and (2) it is a secondary tumor, with infection. The latter will be discussed briefly first. The Habermann-Bezold school, later augmented by Politizer, has been an ardent supporter of this concept. This group contends that cholesteatoma is always associated with chronic infection and is due to immigration of the external auditory canal epithelium through a perforation in membrana flaccida. Wendt,[3] who supported the former theory, believed that a transformation or metaplasia of the antrotympanic mucous membrane occurred as a result of chronic infection. Some unknown factor was held responsible for this change, but Wendt did not feel that invasion from the external auditory canal was contributory. Few otologists, if any, follow this line of reasoning.

The histological structure of cholesteatoma consists of a series of epithelial cells, like those of the rete malpighii of the skin, which passes from the deeper columnar or spherical cells to the surface ones. The cells are without papillae. They act similarly to the skin epidermal cells, multiplying, surfacing, shedding and accumulating. Between this coat of active cells and the underlying normal tissue, again like the skin epidermis, is an avascular fibrous layer which, for the most part, is similar to connective tissue. Both these layers vary in thickness, but their union is generally close. I feel that all cholesteatomas have a cyst wall, though it may be difficult to demonstrate it at all times. In many instances, the wall may be thin, partially present or atrophied due to underlying bony pressure. Emphasis should be put on the fact that the normal tissue, bone and connective tissue beneath the active cell layer show no evidence of any inflammatory process. J. R. Ash[4] defines aural cholesteatoma pathologically as follows: "Cholesteatoma is simply squamous epithelium growing in a confined space, and if considered neoplastic would be more appropriately called Keratoma. The origin of squamous epithelium is in the majority of instances from the epidermidalization of the mucous membrane of the middle ear or mastoid either by—1, extension of squamous epithelium of external auditory canal through a perforation in drum, or 2, by metaplasia. The occasional instance of cholesteatoma without previous chronic suppuration is possibly the result of epidermal inclusion during the development of the ear!" The cells of cholesteatoma act like neoplastic cells; they push and destroy structures in their path. Extremely resistant, every cell, in a surgical procedure, must be destroyed to prevent recurrence.

Primary cholesteatoma does occur as a true tumor in the temporal bone or middle ear. Cases have been reported by Ruttin, Erdheim,[5] Schwartze, Lucae, Korner and Grove.[6] The patients presented themselves with intact drums and without infections. Why do we not consider a single cause for all cases of aural

3. Wendt, H.: Desquamative Entzündung des Mittelohrs ("Cholesteatom des Felsenbeins" der Autoren), Arch. Heilk. **14**:428, 1873.

4. Ash, J. R.: Aural Cholesteatoma, in Anderson, W. A. D.: Pathology, St. Louis, C. V. Mosby Company, 1948, p. 752.

5. Erdheim, J.: Über Schädelcholesteatome, Ztschr. Ohrenh. **49**:281, 1905.

6. Grove, W. E.: Primary Cholesteatoma of the Temporal Bone, Arch. Otolaryng. **10**: 398-408 (Oct.) 1929.

cholesteatoma? Why do we consider most cases as complicating infection in the middle ear? Why is it not more likely for a cyst to form inside the otherwise normal antrotympanic cavity without any preceding infection? Furthermore, in its expansion the cyst may erode the bone of the attic, the external auditory canal or the drum membrane and therefore is an emigration instead of an immigration. Infection with discharge can occur. This would be considered secondary. The greatest bulk of the well known cholesteatomatous mass is the product of the epidermal cell layer. Undoubtedly, many masses seen in the middle ear and diagnosed as cholesteatomas may be composed of pus and caseous material. Primary cholesteatoma is a cystlike tumor which increases in size as it continues to cast off its squamae. The cyst will remain aseptic if it remains closed. Once the cyst breaks through the external auditory canal or the tympanum, it will probably undergo decomposition. This will most likely be due to moisture and putrefactive organisms, thus inevitably producing suppuration.

Ample clinical evidence is available favoring the primary origin of cholesteatoma. Rarely, if ever, is there a history of acute onset. Conversely, no otologist, to our knowledge, has ever followed a case of acute otitis media which progressed to the chronic stage, developing cholesteatoma. Normally, the otologist finds the condition present at the time of the patient's first visit. Also, one occasionally sees a patient with a healed perforation in Shrapnell's membrane who insists that he has a normal ear history. Many surgeons while operating for acute mastoiditis have encountered cholesteatoma. They naturally deduced that the mass was the result of previous chronic infection. The possibility of Eustachian tube infection or acute otitis media in the presence of a primary tumor is always present; consequently, chronic suppuration may follow.

Ruttin believes that it is clinically impossible to distinguish between primary and secondary cholesteatomas. He classifies the primary ones in two groups: (1) those with perforation in Shrapnell's membrane but without otitis and (2) those which are closed off from the middle ear or locked in the temporal bone. Day [7] feels that the term cholesteatoma should be reserved for the cases of the congenital type which develop from misplaced anlages. He states that all others, whether so-called primary or secondary, are due to immigration of epithelium through membrane. The term pseudocholesteatoma would then be applied to all these cases. They would then be classified as primary or secondary depending on whether they develop with or without infection.

REPORT OF A CASE

H. F., a housewife aged 52, presented herself for the first time on April 29, 1949. She complained of a fulness in her right ear which came on suddenly about six months previously. Occasional tinnitus, low in pitch and intermittently pulsating, annoyed her. Pain and vertigo were absent. Hearing was not impaired. No history of discharge, precipitating cause or any preceding aural difficulty was obtained. Panhysterectomy eight years previously was the only significant item in the past history. No childhood diseases were recalled.

The significant findings in the examination were confined to the right ear. The drum membrane appeared normal except for a dry, dull, brownish gray stalklike mass presenting itself for about 0.5 cm. through an anterior perforation in Shrapnell's membrane. All landmarks were present. No depression, retraction or thickening of Shrapnell's membrane was noted. No moisture was evident. The mass did not bleed on probing.

7. Day, K. M.: Primary Pseudocholesteatoma, Arch. Otolaryng. **34**:1144-1151 (Dec.) 1941.

Roentgenograms of the mastoids showed them to be equally well pneumatized, with no clouding or cell destruction. The urine was negative. The red blood cell count was 4,550,000; the white blood cell count 7,000, with a normal differential count. An audiogram showed normal hearing on the left side and a 10 decibel loss on the right side for low tones including 1024 frequency. A biopsy of the tumor was taken on May 19, and the pathologist reported that the specimen received for examination consisted of several whitish granular masses which were submitted in fixing solution. All the material was dehydrated, embedded and sectioned for microscopic study.

Histologically, the specimen was found to be composed entirely of closely packed masses or straight and wavy layers of pink-staining amorphous material believed to be derived from accumulations of desquamated and degenerated squamous epithelial cells which lined a cystic structure. However, no viable tissue of any kind was included. Many of the superficially placed epithelial cells, so-called squamae, had become separated from the compact, layered

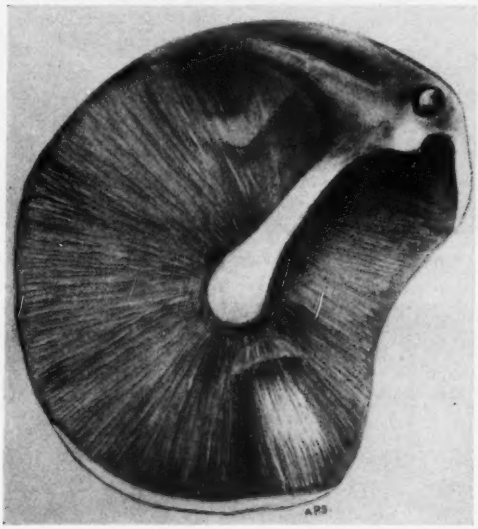

Fig. 1.—Right drum membrane showing gross appearance of cyst protruding through Shrapnell's membrane.

masses and were found free or in small groups or narrow strands. This material was interpreted as the contents of a cholesteatomatous or epidermal inclusion cyst. It was composed of old desquamated epithelial cells which ultimately had become soft, granular and greasy as a result of degeneration.

The patient presented a mass protruding through a perforation in Shrapnell's membrane and arising ostensibly from the attic region. No sign of infection, past or present, was uncovered. Laboratory findings were not significant. Diagnosis could, with certainty, be made only by removal of tissue. The pathology department reported cholesteatoma as the diagnosis when the site of origin was stated as the middle ear. However, section of the mass showed it to be similar to epidermal inclusion cysts found elsewhere.

Despite intensive antibiotic therapy, a middle ear infection with considerable discharge developed. If a biopsy of the mass had not been taken, thus leaving the cyst wall intact, it is highly probable that infection would not have occurred. Otologists may be cautioned against

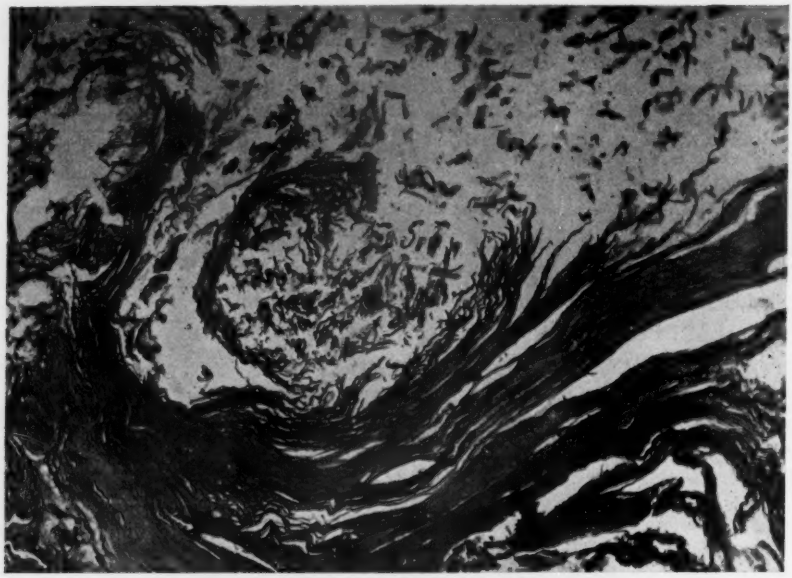

Fig. 2.—Desquamated, keratinized cells of the aural cyst.

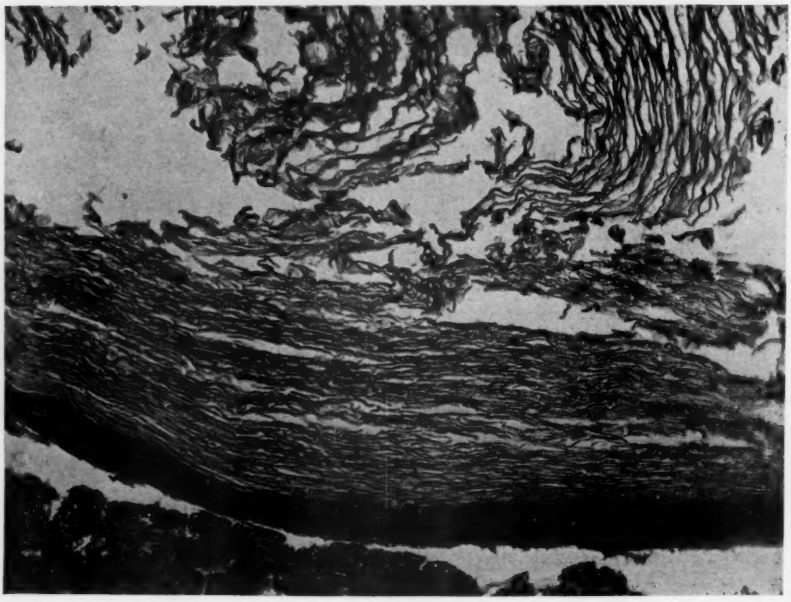

Fig. 3.—Typical epidermal inclusion cyst showing desquamated, keratinized cells and the underlying wall.

disturbing a lesion such as this, thereby avoiding the likelihood of a chronically discharging ear. Malignant growths in Shrapnell's area in a dry ear have not as yet been reported in the literature.

COMMENT

In conclusion, I am of the belief that all cholesteatomas occur in the temporal bone or tympanum as primary real tumors by the inclusion during embryonic life of fetal epidermal cells. If suppuration occurs, it may be considered due to a defect in the wall of the cyst which allows bacterial invasion of the growth.

EXOSTOSIS OF THE EXTERNAL AUDITORY CANAL

LIEUTENANT COLONEL BYRON G. McKIBBEN
MEDICAL CORPS, UNITED STATES ARMY

EXOSTOSES of the external auditory canal vary in size and may be single or multiple. They are relatively frequent, occurring chiefly in late adolescence or early adult life. Men are more subject to these growths than women. Growths large enough to obstruct the canal will cause partial deafness and constitute a serious hazard when middle ear suppuration is present.[1] Secondary inflammation of the cutaneous canal may be caused by pressure of the growths against the opposing wall. Cerumen tends to collect in the narrow slitlike openings.[2]

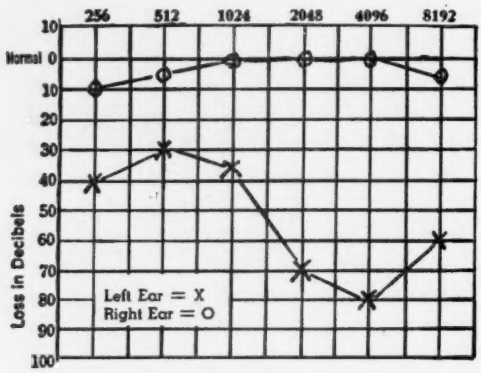

Fig. 1.—Audiogram taken before surgery.

The cause of this pathological change is unknown in the majority of cases, and the reader is referred to the standard textbooks on otolaryngology for a discussion of the theories of etiology. The case presented here is secondary to trauma. It may have been the result of a local periostitis alone or in conjunction with a fracture.

REPORT OF A CASE

A 20 year old youth was referred to the ear, nose and throat clinic on Nov. 21, 1949 for the removal of impacted cerumen from the left external auditory canal. Examination revealed a hard, skin-covered, immobile mass completely occluding the left external auditory canal.

The history revealed that about four years previously while the patient was working in the woods a falling branch injured his left ear canal. There was severe aching of the left ear for about a week after the accident. There was no drainage. About six months later, the hearing in that ear became impaired.

1. Jackson, C., and Jackson, C. L.: Diseases of the Nose, Throat and Ear, Including Bronchoscopy and Esophagoscopy, Philadelphia, W. B. Saunders Company, 1945, p. 222.

2. Ballanger, W. L.; Ballanger, H. C., and Ballanger, J. J.: Diseases of the Nose, Throat and Ear, ed. 9, Philadelphia, Lea & Febiger, 1947, p. 623.

In the Weber test sound lateralized to the deafened ear. The Schwabach test showed no decrease in bone conduction for the left ear. An audiogram (fig. 1) showed a 45 decibel loss in the conversational voice range. A roentgenogram of the temporal bones showed them to be normal.

On December 15, with the patient under endotracheal nitrous oxide-oxygen-ether anesthesia, an attempt to remove the tumor through the external auditory canal was unsuccessful. A postauricular incision, as in mastoidectomy, was then made through the skin, superficial tissues and periosteum. The periosteum was elevated anterior to the incision and into the external auditory canal. The auricle was displaced forward. As the periosteum was further elevated, the pedunculate tumor (fig. 2) was seen attached to the posterior wall of the bony canal, inferior to and slightly internal to Henle's spine. With a small gouge it was separated and removed. It was not necessary to enter the mastoid process. The wound was closed without a drain, and the external auditory canal was lightly packed with petrolatum gauze.

Fig. 2.—Exostosis removed from the left external auditory canal.

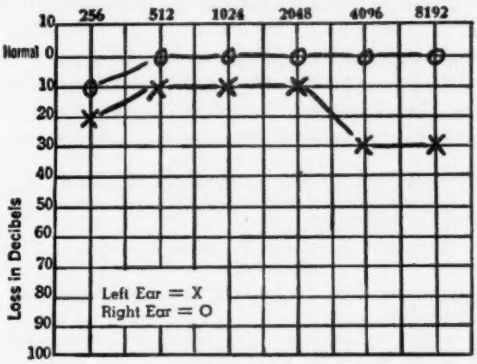

Fig. 3.—Audiogram taken three weeks after surgery.

The patient was administered penicillin intramuscularly, and after the second postoperative day a sterile cotton wick saturated with 5 per cent sulfanilamide in glycerin was inserted into the external auditory canal daily. Sutures were removed on the fourth postoperative day.

During the third postoperative week the external auditory canal showed a small amount of purulent drainage but responded well to dry cleansing and sulfanilamide insufflation. The ear was dry on Jan. 3, 1950, and the external auditory canal showed no sign of stenosis. The tympanic membrane was thickened, scarred and distorted.

An audiogram (fig. 3) on January 8 showed marked improvement, especially in the high frequencies. The audiogram before surgery was typical of the type usually associated with a nerve type of deafness or a mixed deafness with a marked perceptive element. Crowe and Baylor [3] previously demonstrated that conductive deafness may produce a high tone loss in hearing.

3. Crowe, S. J., and Baylor, J. W.: The Prevention of Deafness, J. A. M. A. **112**:585-590 (Feb. 18) 1939.

BILATERAL CONTACT ULCER GRANULOMA FOLLOWING ENDOTRACHEAL ANESTHESIA

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ENDOTRACHEAL anesthesia constitutes one of the great advances of modern anesthesia. It has made chest surgery possible, and in long procedures under general anesthesia or in which there is trouble keeping an airway it is a great comfort for both surgeon and anesthetist. Almost any frequently used procedure has some complications, and there have been, from time to time, reports of laryngeal granuloma appearing at various intervals after endotracheal anesthesia. There are at this time reports of 21 such cases by Clausen,[1] Gould,[2] Cohen,[3] Smiley,[4] Farrior,[5] Kearney,[6] Tuft and Ratner,[7] Barton[8] (two cases), McLaurin,[9] Hill,[10] New and Devine[11] (nine cases) and Wattles.[12] It is the purpose of this paper to add another such case to the literature. No attempt is made to review the literature in detail, as this has been done very completely by New and Devine[11] and later, only one year ago, by Wattles.[12] However, the important factor to be gleaned from such a review will be discussed.

The term laryngeal granuloma probably should be replaced by contact ulcer granuloma as suggested by New and Devine.[11] The lesions arise as a result of a traumatic ulceration of the laryngeal mucosa. Commonly this ulceration is located at or near the tip of the vocal process of the arytenoid cartilage. The lesions tend to

From the Otolaryngological Department of the Fargo Clinic, Fargo, N. D.

1. Clausen, R. J.: Unusual Sequela of Tracheal Intubation, Proc. Roy. Soc. Med. (Anesthetic Sect., pt. 2) **25**:1507 (May) 1932.

2. Gould, R. B.: Laryngeal Granulomas Following Intratracheal Intubation, Brit. M. J. **2**:499-500 (Sept. 14) 1935.

3. Cohen, M.: Tumour of Vocal Cord Following Nasal Endotracheal Anaesthesia, Brit. M. J. **1**:283-284 (Feb. 5) 1938.

4. Smiley, W. A.: Polypoid Granuloma of the Larynx Following Endotracheal Anesthesia, Ann. Otol. Rhin. & Laryng. **49**:556-558 (June) 1940.

5. Farrior, J. B.: Contact Ulcer of Larynx Developing After Intratracheal Anesthesia, Arch. Otolaryng. **36**:238-239 (Aug.) 1942.

6. Kearney, H. L.: Bilateral Granuloma of the Larynx Following Intratracheal Anesthesia, Ann. Otol. Rhinol. & Laryng. **55**:185-187 (March) 1946.

7. Tuft, H. S., and Ratner, S. H.: Laryngeal Polypoid Granuloma Following Intratracheal Anesthesia, Ann. Otol. Rhin. & Laryng. **56**:187-190 (March) 1947.

8. Barton, L. W.: Granuloma of the Larynx: Late Complication of Endotracheal Anesthesia, Ann. Otol. Rhin. & Laryng. **56**:191-193 (March) 1947.

9. McLaurin, J. W.: Bilateral Granuloma of the Larynx Following Endotracheal Anesthesia, Laryngoscope **57**:796-800 (Dec.) 1947.

10. Hill, T. H.: Granuloma Following Endotracheal Anesthesia, Ann. Otol. Rhin. & Laryng. **57**:910-913 (Sept.) 1948.

11. New, G. B., and Devine, D. D.: Contact Ulcer Granuloma, Ann. Otol. Rhin. & Laryng. **58**:548-558 (June) 1949.

12. Wattles, M.: Bilateral Granuloma of the Larynx Following Intratracheal Anesthesia, Ann. Otol. Rhin. & Laryng. **58**:873-882 (Sept.) 1949.

heal from the periphery inward, thus narrowing the base so that in time they usually become pedunculate. Removal in the pedunculate stage has uniformly been followed by total cure, whereas earlier removal in the sessile stage usually requires multiple removals for cure. For this reason it has been advocated that unless there is respiratory embarrassment, the surgeon should await pedunculation of these granulomas before removing them. The primary ulceration is undoubtedly always traumatic, and it has been suggested that the trauma may result from blind intubation, the forcing of a tube through a closed glottis, use of too large an endotracheal tube and perhaps from allowing the patient to gag on the tube at the end of surgery or during light anesthesia. The predisposing factors may be mild inflammation, inherent friability of the particular person's tissue to trauma and perhaps excessive or faulty use of the voice after surgery. The age of the patient and duration of surgery appear to have no relation to the development of granulomas, but they are much commoner in women, whereas ordinary contact ulcer granulomas are commoner in men. This may be because of the use of the same sized endotracheal tube through the relatively smaller larynx in women. There is apparently a slightly greater tendency for these granulomas to occur bilaterally.

In looking over these possible reasons, it is interesting to note that all these cases, with the exception of mine, followed the use of a soft rubber endotracheal tube or Magill tube, while there are no cases reported following bronchoscopy using the smaller but rigid metal bronchoscope. Also, it is well known that there have been many endotracheal tubes passed blindly or with some force and trauma through a partially closed glottis without serious effects. On the other hand, many of these granulomas followed easy, apparently atraumatic intubation. It is probable, however, that no endotracheal anesthesia should be used unless absolutely necessary on people with histories of recurrent hoarseness or who have even mild upper respiratory infections. Also, it would seem wise always to inspect the larynx when the tube is removed and institute proper therapy if it appears necessary. Lastly, it is probably better to use a smaller tube with a balloon when an air-tight fit is desired.

REPORT OF A CASE

On July 7, 1948, a 59 year old white woman in good operative condition underwent a total gastrectomy for a large recurrent gastric ulcer. The usual premedication had been given. The anesthesia was endotracheal with thiopental sodium (pentothal sodium®), curare and nitrous oxide. The operation lasted four hours. Intubation was done under direct vision without difficulty. A latex catheter no. 32 was used. It was withdrawn as soon as the patient began to react. Preoperative laboratory work revealed a normal blood cell and differential count, the chest normal, according to a roentgenogram, the results of the physical examination normal, a basal metabolic rate of plus 1 per cent and a total protein content of 6.7 Gm. per 100 cc. Postoperatively the patient received 1,000 cc. of blood. The postoperative course was uneventful save for a subconjunctival hemorrhage noted on the second postoperative day. Beginning six weeks postoperatively, the patient noted progressive hoarseness. There had been no previous similar episode. She was able to eat everything and was gaining weight well. Indirect laryngoscopy revealed a granuloma on each vocal process. On September 21, under ether and nitrous oxide anesthesia, a direct laryngoscopy was done by the Lynch suspension method, and bilateral large granulomas measuring 0.5 cm. across were found to be attached by pedicles to the tip of each vocal process. Each granuloma was grasped and removed with a scalpel. The hoarseness disappeared, and there has been no recurrence to date, May 1, 1950. The pathology report stated that the growths were angiofibroma.

509 Hermann Professional Building.

Clinical Notes; New Instruments and Techniques

NEWLY DESIGNED PARACENTESIS NEEDLE FOR USE IN AEROTITIS MEDIA

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All changes in ways of living make necessary fresh adaptations to the circumstances created in this way. Every important new discovery brings with it a need for the adoption of ways that conform to the changes created by it. These requirements enter into the field of medicine as they do into other fields related to living.

Probably no one invention of man has caused more need of change of established habits than has that of the airplane. In medicine, a considerable list of new conditions for treatment has been rather suddenly forced on the practicing physician.

Among other conditions that require prompt and careful relief is that of aerotitis media. This condition occurs when the ear is subjected to rapid, extreme changes in barometric pressure. Such changes are constant in flying at different altitudes. If the eustachian tube is not patent, there is no means for equalization of pressure within the middle ear. This is the point of special importance in the occurrence of aerotitis media.

No one should travel in an airplane who has an infection of the nose or throat, since there is always the possibility that the tissues about the entrance to the eustachian tube are edematous or swollen enough to prevent the entrance of air. Hyperplasia of the lymphatic tissue in this region acts in the same way. The precaution of a nose and throat examination should be taken, not only by professional flyers but also by all airplane passengers. Other secondary factors which create a liability to aerotitis media are lack of molar teeth and general malocclusion.

The condition of aerotitis media results from the change in differences in air pressure in the outer canal and within the cavity of the middle ear when a plane makes too sudden and too rapid a descent.[1] The drum membrane sustains an injury which causes an inflammatory reaction in the lining of the middle ear, with retraction of the membrane.

If the vacuum which has been created in the middle ear is not given prompt treatment, an accumulation of serous exudate forms, sometimes with small hemorrhages into the inner surface of the drum membranes. The effect may be less extreme, with only an injection of the membrane, which is most evident along the handle of the malleus and increases over Shrapnell's membrane. When there is exudate in the middle ear cavity there is bulging of the membrane instead of retraction, the degree of which depends on the amount of effusion. The fluid level can usually be seen through the tympanic membrane.

The symptoms of aerotitis vary with the immediate condition within the ear. There is usually a feeling of discomfort in the ear and sometimes pain that may seem to arise in the parotid gland. Dulling of hearing may be present, often accompanied with ringing noises in the ear.

For treatment when there is no exudate but only retraction of the drum membrane, relief will usually follow Politzer's dilatation of the eustachian tube or catheterization may be necessary to secure normal pressure relations. Pain can be relieved by wet or dry hot compresses or other hot applications. If indicated, irrigation with warm water or instillation of warm 5 per cent phenol glycerite may be more effective. If pain is extreme, a sedative may be necessary for its relief.

When serous fluid has collected in the middle ear cavity, a variety of conservative measures has been used in its absorption.[2] As a help in relieving the results of infection in these areas, the

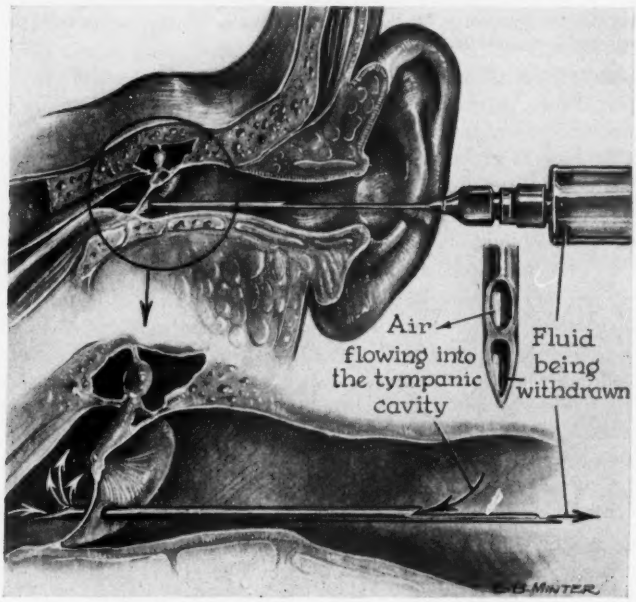
From the Otolaryngologic Service of the University of Pennsylvania School of Medicine, Graduate School.

1. Ballenger, W. L.; Ballenger, H. C., and Ballenger, J. J.: Diseases of the Nose, Throat and Ear, ed. 9, Philadelphia, Lea & Febiger, 1947.

2. Seltzer, A. P.: Diseases of the Eye, Ear, Nose, and Throat: A Textbook for Nurses, New York, McGraw-Hill Book Company, Inc., 1950.

nose and throat may be treated by the local use of astringent solutions and of effective vasoconstricting preparations. The displacement method of Proetz is sometimes used when the paranasal sinuses are affected. Perhaps the most complete and prompt relief has been brought about by the recently devised method reported by Trowbridge.[3] By this means, the fluid in the middle ear is aspirated, the needle being entered through the drum head in the posterior-inferior quadrant, the point being chosen to favor the removal of fluid from all parts of the cavity at one operation.

The same conditions as those described here may occur in otitis media resulting from other causes, as primary infections. The cavity of the middle ear may be the seat of serous effusion, hemorrhage or empyema. In any case, if these fluids are not removed rather promptly, the process goes on to the formation of fibrous tissue and consequent chronic adhesions, which invariably lead to permanent loss of some degree of hearing or final total deafness. Since the



Needle especially adapted to the operation for aerotitis.

introduction of the use of the new treatments of infection, both for prevention and for therapy, these conditions arise less often but have not yet been wholly banished.

To lessen the difficulties that arise in performing the aspiration of the middle ear cavity, since considerable pressure against the drum membrane may be required to enter the needle, sometimes resulting in permanent damage, I have designed a needle especially adapted to the need of this operation.

A stainless steel needle (B-D 22) of the Quincke type is the basis, to which a second barrel, of the same bore as the needle, is added on the lower one-third only.[4] The accessory barrel acts

3. Trowbridge, B. C.: New Treatment of Acute Aero-Otitis Media, Arch. Otolaryng. **50**:255 (Sept.) 1949.

4. The instrument was designed according to my specifications by the George P. Pilling & Son Company, Philadelphia.

to allow the passage of air in or out of the tympanic cavity when the fluid is withdrawn. With the use of the ordinary single needle, the withdrawal of the fluid creates a degree of vacuum as the fluid escapes. That this may occur is indicated by the retraction of the drum membrane during the process. With the newly designed needle, equilibrium of pressure is constant and the withdrawal of fluid also is made easier. The cavity is more thoroughly drained, and the possible discomfort to the patient is lessened.

The procedure for the use of this needle is the same as that for any similar operation on the ear drum, except that the operator must hold the needle very firmly and carefully and to this end an assistant is required to remove the stylet from the needle.

SUMMARY

A needle of new design is described for aspiration of the middle ear cavity in aerotitis media or other similar conditions with effusion or exudate. The improvement consists of an accessory barrel added to the lower one third of the needle. The function of the second barrel is to allow the passage of air to compensate for the fluid withdrawn and in this way to avoid the presence of a vacuum within the middle ear cavity.

2104 Spruce Street (3).

COMBINED PALATE RETRACTOR AND TONGUE PROTRACTOR

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AND
LEO A. KALLEN, M.D.
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THE FORM of the nasopharyngeal space has a wide range of individual variation. The sagittal diameter in the infant may be nearly as long as in the adult. The vault may be extremely round or it may point upward sufficiently to form the contour of a Gothic arch. Most adenotomes are made to fit the normally shaped nasopharynx. Some operative failures may be accounted for on the basis of these morphologic deviations. A promontory formed by the atlas, visible and palpable at the level of the palate, is sometimes associated with a tubercle which may interfere with the blade and cause complication. Also, tortuosity of the internal carotid artery occasionally occurs in this area and should be routinely looked for.

These factors, though infrequently met, nonetheless exist as possibilities and must be borne in mind. They provide sufficient reason for thorough survey of the operative field in any case in which adenoidectomy is contemplated.

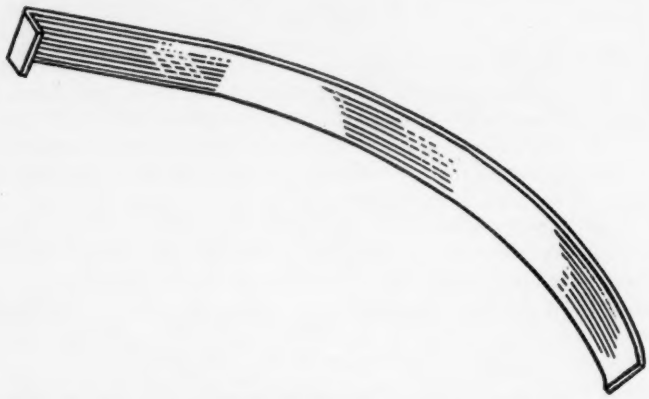
Whatever may be said in favor of digital examination of the naso-pharynx at the preliminary examination, many authorities refrain from performing it, preferring a direct view by one means or another. When tonsils require removal, they prefer to postpone the examination for adenoids until the patient is on the operating table, when the pharyngeal vault can be thoroughly and effectively investigated while the child is under anesthesia. This method has the added advantage of the discovered anatomic data remaining fresh in mind. In addition to the factors already mentioned, information on the shape of the vault, relations of the tori tubarii and size and extent of the adenoidal tissue is readily obtained.

Today it is generally agreed that unless the operation is thorough, recurrence is likely, defeating therewith the purpose of the operation. Attention to details is as indispensable in adenoidectomy as it is in other operative fields. We believe that though removal of adenoids is a simple procedure, a clean result is made more certain by the practice of direct inspection of the nasopharynx both before and after surgery is performed.

Toward this end, we herewith present a simple, inexpensive, easily handled instrument that greatly facilitates direct inspection of the nasopharynx. One end of the instrument makes a very efficient tongue blade. It is curved so as to push the tongue forward more than downward and thereby prevent obstruction to breathing. Also it brings into view the base of the tonsil fossa, the basal lingual area and the epiglottis. For inspection of the nasopharynx, however, both ends are used.

While the assistant or anesthetist holds the tongue out of the way, the soft palate is drawn forward and upward by the angulated end of the instrument to expose the lower part of the adenoid mass. Following the curve of the palate laterally, the areas behind the upper part of the posterior pillars and lateral columns are inspected.

Then the mucosa along the lower edge of the exposed adenoidal mass is incised very superficially from one posterior pillar to the other with the tip of the Neivert tonsil knife or the No. 12 blade. This avoids the possibility of stripping the pharyngeal mucous membrane. Then, the lower portion of the adenoid is partly dissected upward with the retractor end of the knife, so as to create a pocket into which the adenotome blade may slide. The adenotome is inserted and closed to encase the greater portion of the adenoid. The curved end of the palatal retractor is applied, bringing into view the lateral columns, the vault, the Eustachian areas and the adenoidal remnants. The latter are removed by curet or punch. The finger can then explore the higher reaches of the nasopharynx.



The Neivert palate elevator and tongue protractor. The length is 7 inches and width 5/8 inches. The angulated end is used for primary exposure and surgery of lower part of the adenoids. The curved end permits deeper views and is also used as a tongue protractor by the surgeon.

The advantages of this instrument are quickly apparent after one trial. It is very light, yet sufficiently sturdy. Its shape and dimensions allow optimal exposure. Its application is simple and precise, regardless of the type of illumination.

555 Park Avenue (21).

NEW SPECULUM FOR USE IN SURGERY OF THE NASAL SEPTUM

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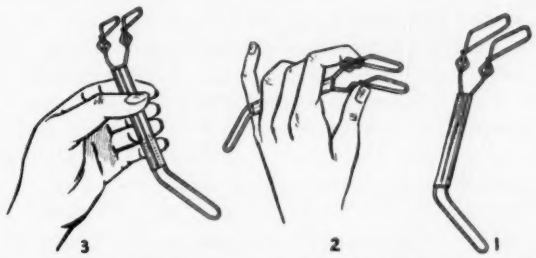
THE INSTRUMENT was designed with two purposes in mind: (1) to combine in a single tool the function of different-sized nasal speculums for dilating the nares and retracting the septal mucosal flaps and (2) to obviate the cumbersomeness of the tools commonly used for these effects through simplification of design and construction.

The speculums generally used in intranasal work are the Killian and Vienna model types. These are not only unwieldy, but *in situ* obstruct both the view and the working space of the operator. These disadvantages are removed when the instrument herein described is used.



1, The Neivert submucous speculum; *2*, the method for holding the speculum for anterior dissection, and *3*, the method for holding the speculum for intraseptal work.

DESCRIPTION AND USE OF INSTRUMENT

The instrument is made of one piece of flattened tubing in which there slides one piece of wire bent to the shape indicated. The nares dilator end has a width control through a sliding action which automatically limits the excursion of its wire blades through the intrinsic tension of its shafts. This also automatically renders the blades self retaining at variable widths. The rigid wire U can retract a single flap by being applied parallel to the flaps, or it can hold both flaps apart when rotated so as to come between them at right angle. This also allows for easy accessibility and manipulation.

When the dilating or vestibular end is used, the instrument is held so that the shaft rests between the third and fourth fingers, while the thumb and the index fingers manipulate the dilator blades. When the intraseptal or retracting end is used, the shaft is held so that the thumb is on one side and the other four fingers on the opposite side. During the entire operation the speculum does not leave the left hand. After the incision has been made and the mucoperichondrium has been elevated about ½ to 1 inch, the instrument is reversed and the intraseptal end is placed between the cartilage and the flap, allowing for the continuation of the separation in full and open view of the operator. After incising the cartilage to the perichondrium of the opposite side, the membrane is elevated for ½ inch. Then the intraseptal end is again inserted to retract

the flap, and the elevation is continued under direct vision. After the elevation is completed, the shaft is slid down to narrow the dilator end, which is then applied so as to straddle the caudal portion of the cartilage, thus isolating it. Under these conditions the cartilage is then removed in the usual way. Following this, the intraseptal end is placed between the flaps in the right angle position and a complete and open view is thus obtained of the remaining septal parts for whatever further work is required.

SUMMARY

This instrument has the following advantages over the ones in common use: 1. It is a single tool combining the functions of variable dilation and retraction. 2. It is extremely light and of simple construction. 3. It can be used for facile manipulation and flexible application without stretching the nares. 4. It is self retaining in controlled dilation of the nares. 5. It gives unencumbered accessibility to the operative field by retraction of one or both septal flaps as desired, without dilating or obscuring the nares or other parts by metal. 6. It gives an unobstructed deep view of the operative field.

555 Park Avenue (21).

Progress in Otolaryngology

Summaries of the Bibliographic Material Available in the Field of Otolaryngology for 1949

PERORAL ENDOSCOPY

LOUIS H. CLERF, M.D.
F. JOHNSON PUTNEY, M.D.
AND
J. J. O'KEEFE, M.D.
PHILADELPHIA

DISEASES OF THE ESOPHAGUS

Surgery of the Esophagus.—While surgery of the esophagus is not a primary problem for the esophagologist, it is nevertheless important for him to have a keen appreciation of the needs of the surgeon so that he may serve in the capacity of a competent consultant. Ochsner and his associates [1] discuss surgery of the esophagus and consider a large number of the lesions of the esophagus that are amenable to surgical treatment. They enunciate certain criteria concerning diagnosis as well as treatment and also emphasize certain of the difficulties and dangers of endoscopic investigation. It is important that the esophagologist enjoy the viewpoint of the thoracic surgeon in this field so that he can provide him with a more adequate evaluation of the problems involved and the information which may be secured by esophagoscopic investigation. It is only in this way that esophagology can hope to be of value to the thoracic surgeon.

The article is recommended for reading by all who are interested in esophagology and particularly in helping the surgeon in the solution of his problem.

In a discussion of dysphagia and extraesophageal pathology, Hart [2] emphasizes that dysphagia always is a symptom which should elicit close attention and thorough clinical investigation. The more important extraesophageal lesions causing dysphagia are discussed and illustrative cases cited. Emphasis is placed on the endoscopic aspects which concern diagnosis and management. Attention is directed to the recent surgical advances. It is believed by Hart that hiatal hernia and carcinoma of the cardiac end of the stomach, both of which may produce dysphagia, probably are more frequent than is commonly believed.

Scleroma.—In 17 cases of scleroderma observed since 1942 by Lindsay,[3] pharyngeal or esophageal involvement was demonstrated by roentgen or esophagoscopic examination or both in 15.

From the department of Laryngology and Bronchoesophagology, Jefferson Medical College Hospital.

1. Ochsner, A.; DeBakey, M. E., and DeCamp, P. T.: Surgery of the Esophagus, Ann. Otol. Rhin. & Laryng. **58**:1171 (Dec.) 1949.

2. Hart, V. K.: Dysphagia and Extraesophageal Pathology: Clinical Review of Some of Important Surgical Lesions from Endoscopic Viewpoint, Laryngoscope **59**:771 (July) 1949.

3. Lindsay, J. R.: Esophageal Lesions in Diffuse Scleroderma, Laryngoscope **59**:83 (Feb.) 1949.

The disease known as generalized scleroderma is a disease of fibrous connective tissue in which the skin and joints are usually affected first, giving rise to the most distressing symptoms. Visceral lesions are also characteristic of the disease, and involvement of the lungs, heart, kidneys and gastrointestinal tract is evident in varying degrees. Disturbance of the swallowing mechanism, first described in 1903 and reported in a few cases between 1931 and 1937, has become recognized as a common characteristic.

Various stages of pathological disturbance are demonstrated and the characteristic roentgenologic and esophagoscopic signs are presented.

The observations which were presented in a former report, consisting basically of roentgenologic evidence of loss of function, esophagoscopic appearances and biopsies from ulcerated areas, have been augmented by gross and microscopic postmortem examinations. Fibrous connective tissue changes, similar to those occurring in the skin, are shown in the walls of the esophagus. Alteration of function of the esophagus is explainable upon the basis of stiffening, interference with muscular action and possibly nerve involvement. The surface changes, consisting in hyperkeratosis or leukoplakia, ulceration and stenosis, appear to require a factor of surface irritation in addition to probable atrophic changes for their production, since they are not constant. The surface irritation is probably supplied by regurgitated gastric juice from which the esophagus is unable to free itself.

The postmortem findings in two cases with stenosis, as well as the accumulated roentgenologic and esophagoscopic evidence in four additional cases with varying degrees of stenosis, appear to have established the presence of gastric mucosa between the stenosed area and the diaphragm, a distance of 2 to 5 cm. Circumstances appear to indicate that this represents a shortening of the esophagus by disease rather than a congenitally short esophagus.

Two factors are present which may contribute to the shortening, the diffuse sclerodermatic process throughout the esophagus and the localized ulceration and fibrosis at the lower end.

Injection Therapy of Esophageal Varices.—While the treatment of esophageal varices by injection of a sclerosing material into the veins through an esophagoscope cannot be considered as a solution of the problem, it nevertheless has proved very helpful in those cases in which splenectomy alone or portacaval anastomosis has been performed but has not entirely eliminated troublesome and at times tragic esophageal hemorrhage. The purpose of injection of the sclerosing solution in the varices is to block the free passage of blood through the esophageal veins that lie immediately beneath the mucosal surface in the hope that new anastomotic channels can convey blood from the portal to the systemic circulation by a route that will not be subjected to the trauma that occurs in the esophagus itself.

Tolan [4] describes the technique employed and reports on his series of 19 cases. The patients' ages ranged from 14 to 58 years. There were 10 males and nine females. Twelve cases were of the so-called typical Banti syndrome, and in seven of these the varices were diagnosed before splenectomy. In the remaining seven the diagnosis of intrahepatic tension or cirrhosis was made. Four of the splenectomized patients were free from bleeding for a period of two to five years. The

4. Tolan, J. F.: Esophageal Varices and Their Treatment by Injection, Laryngoscope **59**:425 (April) 1949.

remaining patients had recurrence of hemorrhages from one to 18 months after splenectomy.

Tolan employed a 5 per cent solution of sodium morrhuate. The amount of solution used depended upon the patient's reaction, although as much as 9 cc. was injected at one treatment without any ill effects. It is his opinion that the amount injected at the first treatment should be limited to be certain that the patient is not sensitive to the drug. He prefers to treat one vein at a time.

There have been no marked ill effects. In some cases the patients complain of pain, which is usually substernal and extends through to the back. This pain is usually due to solution escaping into the perivascular tissues or may be due to spasm in the vessel itself. The pain, however, disappears in 12 to 24 hours. The greatest number of injections in any one case was 12.

Two cases of Banti's disease with associated esophageal varices are reported by Lewy.[5] In one, an apparently excellent and permanent result was demonstrated after injection of sclerosing solution, while in the second improvement was shown, but the course indicated that examination and treatment probably would have to be repeated for a year or more.

The procedure of injection is not difficult for a trained endoscopist and is simpler and safer than the nonendoscopic methods previously employed.

Lye Burns of the Esophagus.—The problem of choosing a method of treatment for patients suffering from lye burns of the esophagus prompted Webb and Woolsey [6] to study their series of cases. Four methods of treatment have been employed in these, namely, early prophylactic dilation with mercury-filled rubber bougies, dilation from above under direct vision after stricture has occurred, gastrostomy with retrograde dilation and surgical repair of the esophagus. Generally speaking, when patients are seen early prophylactic dilation seems to give the most satisfactory results. After the formation of stricture gastrostomy with retrograde dilation, often long and unpleasant, usually produces satisfactory results. While surgical reconstruction was employed in two cases only, it has given promising results.

It was found that localizing the stricture may be misleading unless a thick barium sulfate mixture is employed. The stricture may be missed entirely in a fluoroscopic or roentgenologic examination of a frightened child if a thin barium mixture is employed. The delay obtained with a thick mixture and the dilatation of the esophagus produced above the stricture make visualization much easier. Webb and Woolsey consider esophagoscopy as the most reliable method of localizing strictures and determining whether or not the scar tissue entirely surrounds the esophagus.

In a case of stricture of the esophagus occurring post partum in a 29 year old woman, Hara [7] found that the signs and symptoms were suggestive of corrosive reaction to accidentally ingested chloroform rather than inhalation of the vapor.

5. Lewy, R. B.: Esophageal Varices in Banti's Disease: Report of 2 Cases in Which Condition was Improved with Injection of Sclerosing Solutions, Arch. Otolaryng. **49**:175 (Feb.) 1949.

6. Webb, B., and Woolsey, D. S.: Lye Burns of the Esophagus, J. A. M. A. **141**:384 (Oct. 8) 1949.

7. Hara, H. J.: Stricture of the Esophagus Following Pregnancy: Case Report, Ann. Otol. Rhin. & Laryng. **58**:1230 (Dec.) 1949.

Neither the nature nor the amount of the anesthetic agent used is known; in fact it was believed on the statement of the patient only that it might have been chloroform. The inhalation of the anesthesia lasted for four hours toward the end of the second stage of labor, and of interest is the occurrence of jaundice for a period of eight weeks following the labor. There is also a history that the patient vomited violently for several hours after the delivery. Hara is of the opinion that long-continued violent vomiting following delivery cannot be ruled out as a factor in the development of the stricture.

Hiatal Hernia.—In a report on 24 cases of hiatus hernia by Richards and Crockett [8] emphasis is placed on the need of special roentgenologic and fluoroscopic technique if this condition is to be found more than occasionally and its true incidence ascertained. All but one of these patients complained of pain, either epigastric or substernal, and only one patient had dysphagia. Seventeen of the total of 24 patients had been treated for other conditions (coronary artery disease, gallbladder disease and peptic ulcer) before the correct diagnosis was made.

Brick [9] indicates the relative frequency of hiatus hernia by reporting 308 cases in which the diagnosis was made by x-rays in a two year period. In one of every four cases of hiatus hernia there was a roentgenologic diagnosis of an associated gastrointestinal lesion. Careful evaluation of the clinical course is necessary, therefore, to determine the part that hiatus hernia plays in producing symptoms when an associated lesion is present.

Tracheoesophageal Fistula.—A case of tracheoesophageal fistula occurring from blunt violence without demonstrable injury to the thoracic cage and without emphysema is reported by Albi and Gilchrist.[10] The fistula occurred in the vicinity of the tracheal bifurcation, and the diagnosis was made by esophagoscopy and bronchoscopy together with x-ray study of the chest following ingestion of radiopaque material.

TUMORS OF THE ESOPHAGUS

A case of leiomyoma of the midesophagus removed surgically is described by Hurwitz.[11] The patient was symptom free, but a routine roentgenogram demonstrated a mass which was subsequently found to involve the esophagus. In this case the esophagus was sharply angulated without alteration of mucosal patterns or obstruction; this fact suggests the possibility of an encircling myoma.

Stout, Humphreys and Rottenberg [12] report a case of carcinosarcoma of the esophagus and state that they found 20 reported cases in the literature. The tumor occurred in the lower third of the esophagus as a pedunculated lesion and at esophagoscopy was reported as carcinoma. The true carcinosarcomatous nature of the tumor was not diagnosed until the entire mass was examined histologically after esophagectomy.

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8. Richards, G. G., and Crockett, K. A.: Hiatus Hernia, Arch. Surg. **58**:411 (April) 1949.

9. Brick, I. B.: Incidence of Hiatus Hernia and Associated Lesions Diagnosed by Roentgen Ray, Arch. Surg. **58**:419 (April) 1949.

10. Albi, R. W., and Gilchrist, R. K.: Tracheoesophageal Fistula Caused by Blunt Violence, Arch. Surg. **59**:454 (Sept.) 1949.

11. Hurwitz, A.: Leiomyoma of the Esophagus: Report of Case, Surgery **25**:304 (Feb.) 1949.

12. Stout, A. P.; Humphreys, G. H., II, and Rottenberg, L. A.: A Case of Carcinosarcoma of the Esophagus, Am. J. Roentgenol. **61**:461 (April) 1949.

Clark [13] reports a case of sarcoma of the esophagus which at esophagoscopy completely filled the lumen of the esophagus and presented a polypoid appearance.

Granuloma of Larynx.—In a review of the literature of granuloma of the larynx following intratracheal anesthesia, Wattles [14] found a record of but nine reported cases, by eight authors. It is obvious that not all cases have been reported in the literature. He adds an additional case, that of a woman who had a thyroidectomy performed under intratracheal anesthesia. The anesthesia tube had been placed in the trachea, under direct vision, with a laryngoscope. The tube employed was a Magill-Foregger tube, size 35. The anesthesia was continued for a period of 1 hour and 40 minutes.

The patient complained of sore throat for four days following operation and had severe paroxysms of cough. Although hoarseness developed shortly thereafter, a laryngeal examination was not done until three months later, at which time a polypoid-appearing mass was observed attached to the posterior end of the left vocal cord. The patient was continued on a regimen of vocal rest for about two months, and later there was found a small pedunculated mass attached to the posterior end of the right vocal cord opposite the tumor on the left cord. The tumors were removed by direct laryngoscopy, and the patient made a satisfactory recovery.

Wattles emphasizes that hoarseness following the use of intratracheal anesthesia is indicative of trouble and repeated laryngeal examinations are indicated, so that granuloma will be recognized promptly and appropriate treatment instituted. Obviously, gentleness during intubation should be stressed.

DISEASES OF THE TRACHEA AND BRONCHI

Bronchopulmonary Anatomy.—Jackson [15] agrees with other workers in this field that there is need to establish a smaller and more accurate unit of localization than the pulmonary lobe, not only from an anatomic but also from a pathological standpoint. He reviews the subject of bronchopulmonary segments as it applies to bronchologic and clinical applications.

In pulmonary abscess such studies facilitate both external surgical drainage and postural drainage and give much information concerning endoscopic drainage as well as endobronchial instillation.

Bronchiectasis, a segmental disease, often can be cured by segmental resection rather than removal of an entire lobe or an entire lung, and in this field the segmental concept has exerted an important influence from a surgical standpoint.

In neoplastic disease a recognition of segmental atelectasis has aided enormously in the recognition of localized lesions producing bronchial obstruction, and, while it may not have affected the need for resection of greater amounts of pulmonary tissue, it nevertheless has influenced the need for prompt and early investigation of bronchial segments rather than lobes.

In tuberculosis, much light has been thrown on pathogenesis by the application of modern anatomical concepts, and this unquestionably will influence the thera-

13. Clark, D. E.: Sarcoma of the Esophagus, Arch. Surg. **59**:348 (Aug.) 1949.

14. Wattles, M.: Bilateral Granuloma of the Larynx Following Intratracheal Anesthesia, Ann. Otol. Rhin. & Laryng. **58**:873 (Sept.) 1949.

15. Jackson, C. L.: Bronchopulmonary Anatomy from the Bronchoscopic Viewpoint, Ann. Otol. Rhin & Laryng. **58**:1155 (Dec.) 1949.

peutic measures to be employed. In the management of foreign bodies in the air passages it is very obvious that a knowledge of segmental anatomy is of vital importance, particularly in instances of a more peripherally situated foreign body.

By means of bronchographic studies Di Rienzo [16] demonstrates that not only is the caliber of the bronchus increased during inspiration and reduced during expiration but also regional modifications take place simultaneously at the roots of the bronchial branches, playing the role of functional sphincters. The act of coughing consists of a swift peristaltic wave running from the small bronchi toward the trachea. Di Rienzo believes the thoracic and diaphragmatic pressures are secondary factors, favoring but not causing expulsion of the bronchial contents. In support of this theory it is shown that during cough the content of other thoracic organs, such as the esophagus, is not mobilized and that the act of coughing can be accomplished exclusively in a single lung or even in a single lobe. The reason for the failure of secretions to be expelled in bronchiectasis is advanced as being the destruction of the mucous and muscular sheet, thus preventing the peristaltic wave from originating in the bronchiectatic branches.

Anesthesia in Peroral Endoscopy.—A majority of peroral endoscopic procedures can be carried out with local anesthesia or with no anesthesia without great discomfort to the patient and with satisfactory operative results. The use of local anesthetic agents is attended with a minimal amount of risk, but sometimes alarming and fatal reactions may follow their employment. The comparative risks involved in local and general anesthesia are debatable, and the choice of an anesthetic agent cannot always be made on the basis of risk alone.

Pembleton and Vinson [17] report that, except under unusual conditions or for the solution of troublesome problems, bronchoscopic examination should be made without anesthesia in small children and with local anesthesia in adults. The employment of sedative preoperatively is advisable in children, and the administration of barbiturates preoperatively in adults lessens the reaction to local anesthetics.

The are many reasons for recommending that bronchoscopic examinations be done without anesthesia or with local anesthesia. In contrast to this they found that esophagoscopic and gastroscopic investigations can be performed with the patient under some type of general anesthesia, supplemented in most cases by the introduction of an intratracheal tube. Introduction of an esophagoscope in a child less than 3 years of age without anesthesia or under inhalation anesthesia frequently results in pressure on the trachea and larynx which, combined with spasm of the vocal cord, usually is sufficient to interfere with breathing. Often it is necessary to remove the esophagoscope because of suppression of respiration, and when one is pressed for time hurried instrumentation may add to the risk of the operative procedure. When prolonged investigation is anticipated, the authors recommend the introduction of an intratracheal tube, which obviates respiratory difficulty during examination and permits continuous even anesthesia. Children are put to sleep with vinyl ether (vinethene®), and then ether is given by the open drop method. After intratracheal intubation, anesthesia is maintained according to Ayre's technique, which eliminates resistance and retention of carbon dioxide.

16. Di Rienzo, S.: Bronchial Dynamism, Radiology **53**:168 (Aug.) 1949.

17. Pembleton, W. E., and Vinson, P. P.: Anesthesia in Peroral Endoscopy: Especially General Anesthesia in Esophagoscopy and Gastroscopy, Arch. Otolaryng. **50**:561 (Nov.) 1949

In adults intravenous anesthesia with thiopental sodium (pentothal sodium®) combined with curare is applicable in most instances. An important aid is the application of a local anesthetic in the larynx and trachea. This local preliminary anesthesia will suppress many reflexes and reduce the amount of anesthetic agent required. An endotracheal tube is then inserted for the administration of oxygen, and in this way respiration is completely controlled and the esophagoscopic or gastroscopic manipulation may be performed with ease for the examiner and the patient.

Miller and his associates [18] discuss the conventional methods of obtaining topical anesthesia of the respiratory passages and point out that these entail difficulties for the physician and discomfort to the patient. They employ a method of nebulization anesthesia which has proved successful for bronchoscopy, bronchography, bronchospirometry and endotracheal intubation. The success of the method is based on the particle size of the aerosol produced by the nebulizer. The method is devoid of the disadvantages and dangers of the conventional methods and is accompanied with little or no discomfort to the patient.

The anesthetic solutions preferred are 0.5 per cent tetracaine hydrochloride (pontocaine hydrochloride®) and 4 per cent cocaine. Patients are usually premedicated with pentobarbital (nembutal®) two hours before and morphine and atropine one hour before anesthesia is administered. The dose is varied to suit the individual patient or the preference of the physician.

The anesthetic agent is administered with a special nebulizer and oxygen flow meter adjusted to approximately 6 to 8 liters per minute for continuous nebulization. With the nose occluded by adhesive tape, the patient is instructed to inhale the mist through the rubber mouthpiece. This is continued for approximately 30 minutes. In this way the aerosol reaches the deeper bronchial structures as well as the sensitive areas of the pharynx and larynx. While the procedure requires approximately 30 minutes, it requires only about five minutes of the anesthetist's time to instruct the patient, who then continues to administer his own anesthetic, under supervision, for the remaining 25 minutes.

In a review of the literature, Carabelli [19] states that all authors committing themselves on the actual quantity of tetracaine hydrochloride used for bronchoscopy or bronchography are using far more of the drug than is recommended by the manufacturer. In one case as much as 15 times the recommended dose was used for bronchography. Unnecessarily large amounts of tetracaine hydrochloride are used for these procedures because of the inadequacies inherent in present techniques and instrumentation.

A "one-hand" microatomizer and mirror-cannula, which permit the use of small doses of tetracaine hydrochloride, are prescribed. A technique which makes possible bronchoscopy and bronchography with the use of 20.00 mg. (1 cc. of 2 per cent solution) or less of tetracaine hydrochloride in a 0.25 per cent solution with only morphine and atropine in full doses as an adjuvant sedative is described. An unselected consecutive series of 167 bronchoscopies in adults performed with these techniques with an average of 17.37 mg. of pontocaine® (0.865 cc. of 2 per cent

18. Miller, J. B.; Mann, F., and Abramson, H. A.: A Method for Topical Anesthesia by Nebulization of Local Anesthetics, Dis. Chest **16**:408 (Oct.) 1949.

19. Carabelli, A. A.: Laryngo-Tracheo-Bronchial Anesthesia for Bronchoscopy and Bronchography with Pontocaine, Dis. Chest **15**:532 (May) 1949.

solution) and with no complications attributable to tetracaine hydrochloride is reported. This entire series was performed without the use of any barbiturate to counteract the reactions to tetracaine hydrochloride.

The author considers tetracaine hydrochloride in 0.25 per cent solution as a safe, effective and long-lasting surface anesthetic suitable for the procedures of bronchoscopy and bronchography.

Acute Laryngotracheobronchitis.—In a discussion of therapy of acute laryngotracheobronchitis, Simpson [20] again emphasizes the importance of humidification which employs some method that can deliver cool moist air together with adequate quantities of oxygen.

Obstruction of the passages has been the chief obstacle to successful treatment, and while the earlier plans included bronchoscopy with removal of secretion and crusts and tracheotomy, these in themselves are not adequate unless supplemented by other aids, the chief of which is the use of adequate moist air and oxygen.

He lists the indications for tracheotomy but emphasizes that, except in the hands of experts, tracheotomy on a small child is a hazardous procedure. In addition, the postoperative care requires specially trained nursing assistants, and unless these too are available the hazards are greatly increased.

Penicillin in Chronic Pulmonary Suppuration.—To determine the penicillin concentration in diseased portions of the lungs following various methods of administration, Gaensler and his associates [21] studied four patients with chronic purulent disorders of the lung (bronchiectasis and lung abscess). Each patient was given 100,000 units of penicillin intramuscularly, intratracheally and by the aerosol route. Blood, urine and sputum specimens were collected over a 24 hour period following administration and were assayed for their penicillin contents. None of the four patients showed detectable penicillin activity in the sputum at any time following intramuscular injection of 100,000 units of penicillin. The blood levels and urinary excretion during administration by the endotracheal and aerosol routes were approximately the same as those found in the normal lung. This may be interpreted as demonstrating systemic absorption from the normal portions of the diseased lung. There was expectoration of 14 to 83 per cent of the penicillin administered during the first six hours following intratracheal administration; 5 to 25 per cent of the penicillin was recovered in the sputum after aerosol administration.

Both the intratracheal and the aerosol methods were shown to be effective. The latter is generally to be preferred, except when intubation is necessary for other reasons. The intratracheal route of administration is further suggested as a rapid means of decreasing sputum and cough prior to surgery.

It would appear, therefore, that parenteral therapy alone is unsatisfactory in chronic suppurative diseases of the lung. The failure in these cases of biotherapeutic agents administered by this method may lie in their inability to reach the site of the lesion.

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20. Simpson, J. R.: Management of Acute Laryngotracheobronchitis, Arch. Otolaryng. **50**:724 (Dec.) 1949.

21. Gaensler, E. A.; Beakey, J. F., and Segal, M. S.: Relative Effectiveness of Parenteral, Intratracheal and Aerosol Penicillin in Chronic Suppurative Disease of the Lung, J. Thoracic Surg. **18**:546 (Aug.) 1949.

Friedman [22] describes a simple method for the administration of antibiotics and other indicated substances by aerosol in the treatment of acute and chronic bronchopulmonary disorders. The results achieved and the problems encountered in a representative group of patients suffering from common varieties of ordinarily resistant, acute and chronic bronchopulmonary disorders treated with aerosol therapy have been recorded. The importance of palliative, prophylactic and therapeutic aerosol administration in the medical and surgical management of bronchopulmonary diseases is adequately demonstrated.

Fariñas and his associates [23] have used a technique developed by them for mucosography of the respiratory tract and applied in the treatment of suppurative disease of the lung. This preliminary report covers a group of cases in which treatment was given with penicillin in concentrations between 100,000 and 500,000 units dissolved in isotonic saline solution. The application was made daily with progressive increases in the doses of penicillin. The authors prefer crystalline penicillin because it is better tolerated; the volume used has been 5 cc. Use of larger amounts has no advantage, for it delays the method and pharyngeal irritation develops. It is an easy method to use, with no risk or disturbance to the patient. The amount of anesthesia used is very small, atomization of 2 cc. of 0.5 per cent tetracaine hydrochloride solution being sufficient. The atomization is performed continuously—that is, in both phases of respiration—in order that the patient may keep open the glottis to avoid cough and pharyngeal contractions. The supraglottic and infraglottic techniques have been used; the supraglottic technique is preferred because it is better tolerated.

The results obtained are definitely encouraging. The authors have succeeded in improving and curing suppurative lung conditions, some of which were of more than six months' duration and had been previously treated without success with penicillin and sulfonamides. It is interesting to point out that the simultaneous study of sputum and blood in their patients shows high antibiotic action in the sputum and rather low antibiotic action in the blood. The antibiotic action of the sputum fluctuated between 130 units maximum and 40 units minimum and the antibiotic action of the blood fluctuated between 30 units maximum and 2 units minimum.

Respiratory Emergencies in the Newborn.—Pathological changes in the newborn's respiratory tract show clinical signs early in life. In a study of the respiratory emergencies in the newborn, Goff [24] found that lesions in the larynx are relatively uncommon when compared with those in the lung. Of the bronchopulmonary emergencies, atelectasis was found to be by far the commonest. All babies are born with incompletely expanded lungs, and this condition has been demonstrated roentgenologically to exist for more than one week after birth. It is normal and does not constitute a pathological state.

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22. Friedman, L.: Aerosol Therapy of Bronchopulmonary Diseases, Dis. Chest **16**:848 (Dec.) 1949.

23. Fariñas, P. L.; deBustamante, O. S.; Lott, L. M., and Revuelta, R.: Intratracheal Atomization in the Treatment of Infectious Diseases of the Respiratory System: Preliminary Report, Dis. Chest **15**:546 (May) 1949.

24. Goff, W. F.: Respiratory Emergencies in the Newborn, West. J. Surg. **57**:49 (Feb.) 1949.

In a five year survey there were found 157 infants with congenital atelectasis in a total of 13,515 live births. Of the 157, 95 were premature and 62 full term infants. Ninety-five per cent of premature atelectatic and 50 per cent of full term atelectatic babies died.

It is necessary to make a distinction between atelectasis due to an unexpanded unaerated lung and that due to bronchial obstruction from retained or aspirated secretions. For the latter, tracheal or bronchoscopic aspiration is valuable. In the case of an unexpanded lung, special emphasis should be given to the early gentle toilet of the respiratory passages followed by the administration of oxygen and the maintenance of external heat.

Evans [25] reports on two cases of congenital tracheal stenosis in infants due to malformation of the tracheal cartilages, which caused respiratory distress. He also reports two cases of bronchial obstruction due to congenital malformations. In one, there was collapse of the bronchial lumen with atelectasis of the lung due to a deficiency of the cartilage in the wall. In the other there was partial obstruction due to cysts in the bronchial lumen, with defects in the cartilaginous structures of the bronchial wall.

An excellent article on the mechanism of tracheal obstruction, its causes and treatment is presented by Norris.[26] The causes occurring in infancy, childhood and adult life are considered in detail and many illustrative cases are presented to emphasize the general characteristics of the obstruction, the diagnostic features and the treatment indicated. This article merits careful study.

The cases of five patients who exhibited severe stridor and dysphagia are reported by Neuhauser.[27] The symptoms were due to a right aortic arch, with the thoracic aorta descending on the right side and a ligamentum arteriosum arising from the pulmonary artery and passing to the left of the trachea and esophagus and behind the esophagus to the thoracic aorta, producing a constrictive ring. Complete relief of stridor and dysphagia was obtained by surgical exploration, with division of the ligamentum arteriosum and freeing of the vascular structures.

Advances in Bronchology.—In a discussion of recent advances in the field of bronchology and in the diagnosis and treatment of pulmonary disease, Moersch [28] emphasizes that during the past few years much progress has been made. The usefulness of bronchology in the study of fungous infections of the lung has been amply covered in the literature. The possibility of establishing a diagnosis of pulmonary infections is far greater from a study of cultures of bronchial secretions than from a study of samples of sputum alone.

Bronchology has been of definite assistance in the study of pulmonary physiology and in the understanding of factors that may play a role in its alteration. It has been demonstrated that bronchology may often be of value in the study of pulmonary lesions of obscure origin or type, such as Boeck's sarcoid, amyloid dis-

25. Evans, W. A., Jr.: Congenital Obstructions of the Respiratory Tract: Tracheal Malformations, Am. J. Roentgenol. **62**:167 (Aug.) 1949.

26. Norris, C. M.: Tracheal Obstruction, Laryngoscope **59**:595 (June) 1949.

27. Neuhauser, E. B. D.: Tracheo-Esophageal Constriction Produced by Right Aortic Arch and Left Ligamentum Arteriosum, Am. J. Roentgenol. **62**:493 (Oct. 1) 1949.

28. Moersch, H. J.: Recent Advances in Bronchology and in the Diagnosis and Treatment of Pulmonary Disease, Ann. Otol. Rhin. & Laryng. **58**:1199 (Dec.) 1949.

ease and pulmonary fibrosis associated with acrosclerosis. Bronchology truly has more than justified the confidence of the men who first promoted its development.

While bronchial infection is so common that little attention is paid to it unless it is acute or troublesome by nature of its severity, Levine and Klein [29] point out that changes of varying degrees of severity in the ventilatory mechanism, even in the entire function of respiration, may occur during the course of a severe bronchial infection. In a series of tests carried out on patients it was found that in bronchial infection accompanied with a slight degree of obstruction to the passage of air by reason of swelling of the mucosa and an increase in secretions together with probably a greater degree of contraction which may result in spasm there is a tendency for air to be trapped within the lung.

Since ventilation and circulation go hand in hand, it follows that the area that is not ventilated during normal respiration has likewise a very small share of pulmonary circulation. Thus when greater demand is placed on the lung and it becomes necesary to increase ventilation, these areas are called into play, but their function is far from efficient. Levine and Klein explain the sudden and extreme disability shown by these patients on extraordinary exertion as the result of these changes. They emphasize that until the latest stage is reached, that of actual emphysema and fibrosis, disabling symptoms do not occur during rest or during normal activity.

Since the mechanism of disability has been observed by experimental methods and is seen clinically when exertion or emotion causes hyperventilation, one should not be lulled into a sense of false security by the absence of symptoms but should consider every case of infection of the bronchi, regardless of how mild it may be, as a case requiring definitive treatment.

Bronchiectasis.—In a discussion of the use of bronchoscopy in bronchiectasis, Woodward and White [30] find that, although bronchoscopy is playing a diminishing role, its many uses in diagnosis and treatment and particularly prophylaxis are so necessary and important that they believe it should be employed in all cases as a part of a routine examination. Its routine use is necessary in order to make a more exact diagnosis, and it may be employed as a method of treatment in selected cases and, finally, as a very important and valuable prophylactic procedure.

Bronchoscopy in Asthma.—While bronchoscopy commonly is employed in bronchial asthma, mainly for the purpose of differentiating it from other types of wheezing, there is some difference of opinion regarding the desirability of utilizing this procedure for all asthmatic patients in a moribund state. Waldbott [31] reviewed the records of therapeutic bronchoscopies in 112 patients with allergic asthma in the hope that by doing this distinct criteria could be set up for the indications and contraindications for bronchoscopic therapy.

The chief indication for bronchoscopic therapy in bronchial asthma is the state of emergency which arises from the patient's inability to expel the characteristic

29. Levine, E. R., and Klein, W. S.: Physiological Respiratory Changes Associated with Bronchial Infection, Ann. Otol. Rhin. & Laryng. **58**:1148 (Dec.) 1949.

30. Woodward, F. D., and White, M. L., Jr.: The Use of Bronchoscopy in Bronchiectasis, Dis. Chest **16**:94 (July) 1949.

31. Waldbott, G. L.: Use and Abuse of Bronchoscopy in Allergic Asthma, J. Thoracic Surg. **18**:526 (Aug.) 1949.

thick tenacious mucus, which might lead to asphyxiation. In a moribund asthmatic patient, therefore, bronchoscopy is as obligatory a procedure as the removal of a foreign body from a bronchus or as tracheotomy in a patient about to become asphyxiated from diphtheria.

Other purposes of bronchoscopic treatment are the breaking up of a chronic state of asthma regardless of its severity, the relief of atelectasis, the dilatation of cicatricial bronchostricture and, occasionally, the relief of bronchiectasis in asthmatic persons. This treatment is contraindicated for persons with asthma of short duration, asthma associated with allergic shock and other conditions when there is no clinical evidence of mucus plugs.

The main hazards in bronchoscopy are sensitivity to and intolerance of anesthetics and medications administered before and after bronchoscopy as well as medications introduced endobronchially. For this reason, little or no anesthesia is used, and only saline solution is employed for lavage of the bronchial tree.

Introduction of antibiotics into the bronchi may be desirable if infection is the dominant cause of the attacks. However, they should be used very judiciously, and an attempt should be made to avoid reactions from sensitivity to them.

Broncholithiasis.—Seven cases of active bronchopulmonary lithiasis are reported by Freedman and Billings,[32] and in one of the cases the stones were expectorated. Bronchopulmonary lithiasis should be included in the differential diagnosis of bronchial obstruction, pulmonary suppuration and hemorrhage associated with paroxysmal attacks of cough. Although the roentgenogram of the chest may show calcific shadows in the region of consolidated areas, laminagraphy is an important diagnostic aid, as it may demonstrate the stone perforating the bronchial wall or lying in the lumen of the bronchus.

Broncholiths more frequently appear in the right bronchus. In the case reported by Penta [33] there was a history of intractable asthma for 10 years. The patient became progressively worse, and when Penta was called to see her she appeared moribund and exhibited marked bilateral obstructive emphysema. It was believed that bronchoscopy was indicated, and when this was carried out masses of granulation-like tissue obstructing the main bronchi were found at the lower end of the trachea. When removal was attempted, the forceps met with a hard object which gave a grating sensation to the blades. This was removed and proved to be an enormous broncholith, which apparently had intruded into the air passageway at the carinal level. The patient ultimately made a satisfactory recovery, although bronchographic studies revealed incipient bronchiectasis involving the lower lobes of both lungs.

Scleroma.—Three cases of scleroma of the larynx, trachea and bronchi are presented by Miller.[34] The usual laryngeal lesions appear to be only a slightly reddened infiltration of the true cords, with large obstructing granulomatous infil-

32. Freedman, E., and Billings, J. H.: Active Bronchopulmonary Lithiasis, Radiology **53**:203 (Aug.) 1949.

33. Penta, A. Q.: Perforation of Both Main Stem Bronchi by a Large Broncholith Located in the Subcarinal Region: Uneventful Recovery Following Its Endoscopic Removal, Ann. Otol. Rhin. & Laryng. **58**:1135 (Dec.) 1949.

34. Miller, A. H.: Scleroma of the Larynx, Trachea and Bronchi, Laryngoscope **59**:506 (May) 1949.

tration of the subglottic area. Scleromatous lesions in the trachea and bronchi tend to be of the diffuse concentric infiltrative type of either the firm granulomatous stage or the later fibrotic stenotic stage. The disease should be suspected whenever there is a stenosing obstruction of the trachea and bronchi. If biopsies do not show all the characteristics of this disease, the diagnosis can many times be proved by biopsies and culture from the nose. In treatment, streptomycin seems to offer better results than anything else used so far.

Granuloma Following Bronchography.—Iodized oil has been widely used as a diagnostic aid and is generally regarded as a safe procedure. There have been few acute reactions, several of them fatal, after bronchography. These have nearly all been attributed to anaphylaxis, mechanical overfilling, or obstruction of bronchi. Storrs and his associate [35] observed in a patient at operation three weeks after bronchography with chloriodized oil (iodochlorol®—iodized and chlorinated peanut oil) a granulomatous process of the lung apparently caused by the iodized oil. The pathological evidence in their case indicated definitely that the process found in the lung at operation was caused by the presence of the iodized peanut oil introduced for the purpose of making bronchograms. While such a response must be a very rare occurrence, since but three cases have been reported in the literature, it seems entirely possible that lower degrees of such reaction may occur more frequently than has been recognized.

Of clinical importance, the reaction in this case was an apparent reduction of the patient's pulmonary reserve necessitating the use of oxygen therapy for a comparatively long period after operation. The process so far as could be determined was a reversible one, and the outcome was satisfactory. It would seem, therefore, desirable to empty the bronchial tree of iodized oil as quickly and completely as possible after the bronchography and, further, to make roentgenograms of the chest prior to surgical intervention in all cases in which bronchography has been done and to delay surgical intervention in those cases in which any considerable amount of residual oil is observed on the roentgenograms.

Tuberculous Tracheobronchitis.—O'Keefe [36] reviews the effects of streptomycin in the treatment of tuberculous laryngitis and tuberculous tracheobronchitis and compares these results with those of treatment employing agents which existed prior to the advent of streptomycin. A review of these earlier agents indicated that there was a lack of specificity of action, that there was a limitation of their applications and that none were instrumental in controlling the source of infection.

On the basis of his experiences in a series of 62 cases, he found that streptomycin exhibits the most effective results of any therapeutic agent employed. He further observes that the combination of parenteral and aerosol methods of administration appear to be the most effective both as to the rapidity of response and as to an arrest of the lesions. The parenteral administration consists in intramuscular injection of 500 mg. of streptomycin twice daily. The aerosol solution consists of 50 mg. of the drug in 1 cc. of sterile isotonic sodium chloride solution administered by nebulization every two hours for a total daily dose of 500 mg.

35. Storrs, R. P.; McDonald, J. R., and Good, C. A.: Lipoid Granuloma of the Lung Following Bronchography with Iodized Oil, J. Thoracic Surg. **18**:561 (Aug.) 1949.

36. O'Keefe, J. J.: Tuberculous Laryngitis and Tracheobronchitis, Ann. Otol. Rhin. & Laryng. **58**:441 (June) 1949.

Olsen and Hinshaw [37] found preliminary reports on the treatment of tuberculous laryngitis and tuberculous ulceration of the trachea and major bronchi with streptomycin most encouraging. Ulcers were reported to have healed with amazing speed in the cases in which such treatment was carried out. It is feared that results will be less dramatic when a larger number of patients are treated with streptomycin. They report prompt and apparently permanent healing of the ulcerative lesions in the first three patients treated. There has been no recurrence of the disease in these patients during the interval of one and one-half to three years of observation since healing was achieved. Equally dramatic results have been observed in three additional cases. Prompt healing of the bronchial ulceration was noted after treatment with streptomycin, but considerable fibrotic stenosis persisted. The use of streptomycin has apparently reduced the danger of bronchoscopic manipulation and biopsy in the presence of tuberculosis. One no longer hesitates to remove granulation tissue from the trachea or bronchi, take specimens for biopsy or dilate the stenotic bronchi in tuberculous patients; in fact, the removal of obstructive tissue often is apparently essential in a complete treatment of such lesions.

In a clinical study of 25 cases of proved tuberculous tracheobronchitis, Cohen and Yue [38] find that streptomycin, in doses of 1 Gm. daily, produces healing or marked improvement in 21 (84 per cent) of the patients with acute tuberculous bronchitis. The duration of treatment with streptomycin was determined by repeated bronchoscopic examinations and varied from 30 to 120 days in this series. At the present time treatment seldom exceeds 60 days. Measures to control the associated pulmonary tuberculosis should be instituted as soon as practical after therapy with streptomycin has been completed. Irreversible chronic bronchial and pulmonary changes may be averted by the judicious and timely use of streptomycin.

Primary Childhood Tuberculosis.—The bronchial effects of primary tuberculosis in childhood has been thoroughly studied by Hutchinson.[39] He capably reviews and comments on the etiologic reasons ascribed to the obstructive phenomena noted in this disease entity and, more pertinently, has bronchoscopically investigated the endobronchial lesions in 30 such children. He has grouped these patients according to the various types of bronchial lesions observed and by following them bronchoscopically is then able to offer a reasonably reliable prognosis.

Deformity by extrabronchial pressure, invasion by peribronchial lymph nodes and actual rupture of the bronchial walls by such nodes, with the consequent formation of granulations, have effected the phenomena of obstructive emphysema or obstructive atelectasis. Further observations revealed the presence of bronchial stenosis and bronchiectasis in some of these patients.

Air Pollution.—In a discussion of accidents in which many persons either died or were made ill from smog containing toxic substances, Gill [40] emphasizes the

37. Olsen, A. M., and Hinshaw, H. C.: Tuberculosis of the Trachea and Major Bronchi: Results of Treatment with Streptomycin, Am. Rev. Tuberc. **60**:32 (July) 1949.

38. Cohen, S. S., and Yue, W.-Y.: The Treatment of Tuberculous Tracheobronchitis with Streptomycin, Dis. Chest **16**:791 (Dec.) 1949.

39. Hutchinson, J. H.: Bronchoscopic Studies in Primary Tuberculosis in Childhood, Quart. J. Med. **18**:21 (Jan.) 1949.

40. Gill, E. G.: The Effects of Air Pollution on the Respiratory Tract, Ann. Otol. Rhin. & Laryng. **58**:1141 (Dec.) 1949.

importance of control of air pollution. Serious effects on respiratory health from atmospheric pollution have been demonstrated by numerous scientific studies. The increased incidence of carcinoma of the air passages may be caused by such an agent. He considers it the public duty of otolaryngologists as well as of physicians in general to become more informed about the hazards to health of atmospheric pollution and to insist that proper public action be taken.

PULMONARY TUMORS

Diagnosis of Tumors.—In discussing pulmonary tumors, Adams [41] enumerates the various aids that are important in diagnosis and in evaluation. He considers bronchoscopy next to roentgen examination as the most important definitive procedure in the evaluation of patients. Evaluation is used as a broader term than diagnosis, for if the bronchoscope is employed solely to pass a forceps and excise a piece of tissue when found, the value of the endoscopic study would be limited in the same fashion as if a single roentgenogram were made in a roentgenologic study.

The indications for the performance of bronchoscopy are symptoms and signs or roentgenologic findings of bronchial encroachment or obstruction. The bronchologist should observe the mobility of the vocal cords and any variation from the normal size, contour, flexibility, direction and position of the trachea, carina and primary lobar and segmental bronchi. He should note the appearances of the bronchial mucosa and the location, amount and type of secretions and observe and record the exact position and gross appearance of any tumor found, with particuar thought to its operability. When indicated, the upper lobe bronchial orifices should be examined with optical systems which permit visualization of them. In addition, he may irrigate and aspirate secretions by the use of appropriately curved tubes from any segmental bronchus in the lung in order to secure materials for cytologic study. While positive evidence from such an endoscopic examination is important, it is also important if the evidence is negative.

Adams believes that if all cases are handled in this manner by a competent endoscopist acting as a consultant with clinical acquaintance of the case, one may anticipate that bronchoscopy will have been done in approximately 80 per cent of eventually proved cases of lung cancer and in 90 per cent of the cases in which it has been done the diagnosis will have been made thereby or stated as a positive suspicion from the collateral observations which the bronchologist makes. If the bronchoscopy is handled by one with no knowledge of the case but familiar only with the technical introduction of endoscopic tubes, the results will be less rewarding.

Tumors of the upper lobe of a lung present difficulties in diagnosis not commonly encountered in tumors of the lower lobe, which are readily examined bronchoscopically by the usual methods. In a discussion of this subject, Tucker [42] emphasizes that careful technique in the use of telescopic inserts has largely overcome this difficulty. In addition, obtaining materials for bacteriological and

41. Adams, R.: Diagnosis and Treatment of Lung Tumor, Am. Rev. Tuberc. **59**:353 (April) 1949.

42. Tucker, G.: Tumors of the Upper Lobe of the Lung: Bronchologic Aid in Diagnosis and Treatment, Ann. Otol. Rhin. & Laryng. **58**:1211 (Dec.) 1949.

cytologic examination now is possible and has aided greatly in diagnosis. X-ray examination by positioning the patient and body section roentgenography are indispensable for definite localization. He discusses a group of cases in which the endoscopic findings were unusual. These included cases of benign tumor, sarcoma and carcinoma of the upper lobes of the lungs.

Tracheal Tumors.—Two cases of angiomatous tracheal tumors, both in infants 11 months of age, are reported by Gilbert and his associates.[43] In a review of the literature, 39 cases of tracheal tumors in infants and children were found, and 10 per cent of the growths were angiomas. The authors emphasize the importance of bronchoscopy and lateral roentgenography of the neck.

Adenoma of the trachea is a rare tumor. In a study of the literature, McCart [44] finds three recorded cases and adds a fourth.

In his case, that of a woman aged 29 years, there was progressive dyspnea over a period of three months. This is a common symptom of every malignant tracheal tumor. The lesion appeared in the right subglottic region, and it was necessary to do tracheotomy for relief of dyspnea. The lesion was removed by use of biting forceps with coagulation of its base, but there was recurrence within six months and a total laryngectomy then was done. Microscopic examination revealed definite malignant changes in the tumor. A study of the tissues revealed that there was invasion of the strap muscles, and later there was noted a small recurrence in the skin; hence it is difficult to determine whether metastasis beyond the site of operation had already occurred prior to the more radical plan of treatment.

Bronchial Adenoma.—In a study of 50 cases of endoscopically proved adenoma of the bronchus, Som [45] reports that 15 patients (30 per cent) were completely cured or symptom free after bronchoscopic removal, usually with coagulation of the base. Those patients are designated as cured who (1) have an absence of any symptoms referable to the bronchi or lung, (2) have no abnormal chest findings clinically, (3) have no apparent lesion on a roentgenogram of the chest, (4) have a widely patent bronchial lumen on bronchoscopy and (5) show normal findings on repeated bronchoscopic biopsies of tissue from the site of the tumor.

In all the successful cases a smooth globular tumor with a limited attachment was seen bronchoscopically. Stenosis of the bronchus or evidences of extrabronchial compression were seen in 16 instances, all of which proved not amenable to endoscopic therapy. Although the finding of a globular smooth tumor does not necessarily imply that the tumor is amenable to bronchoscopic removal, the appearance of the bronchus after repeated bronchoscopic treatment may give a clue to the possibility of a cure and the advisability of continued bronchoscopy. The number of treatments required before the tumor was completely removed and the biopsy findings reported as consistently negative for adenoma were between three and eight.

43. Gilbert, J. G.; Kaufman, B., and Mazzarella, L. A.: Tracheal Tumors in Infants and Children, J. Pediat. **35**:63 (July) 1949.

44. McCart, H.: Adenoma of the Trachea, Ann. Otol. Rhin. & Laryng. **58**:1217 (Dec.) 1949.

45. Som, M. L.: Adenoma of the Bronchus: Endoscopic Treatment in Selected Cases, J. Thoracic Surg. **18**:462 (Aug.) 1949.

Unlike patients with carcinoma of the bronchus, untreated patients with adenoma have a life expectancy of 10 to 20 years. In a person of advancing years, therefore, the need for lobectomy or pneumonectomy is not nearly so urgent as in instances of true malignant neoplasm.

Rabin and Neuhof [46] present an analysis of a series of 64 cases of adenoma of the bronchus. They discuss the pathological appearances and emphasize that cylindromas comprise a separate entity and should not be included with bronchial adenoma. They consider it inadvisable to persist in bronchoscopic treatment of adenomas in branch bronchi where they are not readily accessible or of adenomas in any bronchi when there is evidence of extension beyond the bronchial walls. It would appear clear, therefore, that lobectomy is indicated for branch bronchial tumors and for most tumors in the upper and middle lobes. The two main indications for pneumonectomy for tumors of the main bronchus are extension beyond the wall of the bronchus and regional lymph node involvement.

Van Hazel and his associates [47] report and analyze 20 cases of adenoma and two of cylindroma of the bronchus according to history and clinical, roentgen and bronchoscopic findings. The histopathology is discussed to emphasize the differentiation between adenomas and cylindromas. Adenomas are considered as extremely slow-growing but invasive tumors rather than as metastasizing malignant neoplasms, whereas cylindromas meet all the criteria of malignant lesions.

Choice of therapy is influenced by the location and histological character of the lesion, the presence or absence of bronchopulmonary changes peripheral to the lesion, the degree of hemorrhage associated with the bronchoscopic procedures and the response to endobronchial therapy. Of the 20 patients with adenoma, 10 were treated by bronchoscopy alone and 10 by subsequent surgical procedures. Of the former group (bronchoscopic), complete removal was effected in five, of whom four are improved and one was seen for biopsy only and has not been traceable. Of the latter group (surgical), total pneumonectomy was performed on six; four are living and well, one is improved and one died postoperatively. Lobectomy was performed on three patients; one is living and well, one is improved and one died postoperatively. The tenth surgically treated patient had mere thoracotomy with cautery drainage, resection being impossible because of extensive adhesions. In the group with cylindroma one patient was treated bronchoscopically for five and one-half years merely to keep the tracheal and bronchial airway open, since the tumor had involved the entire right bronchus and invaded the trachea at the time of diagnosis. The second patient in this group was treated by immediate pneumonectomy but had a recurrence five and one-half years later.

There has been considerable discussion relative to whether adenomas are benign bronchial tumors or whether they may become malignant. Goldman [48] reports five patients showing malignant qualities in bronchial adenoma. The most malignant changes were found to occur in the mixed tumor type of bronchial adenoma.

46. Rabin, C. B., and Neuhof, H.: Adenoma of the Bronchus, J. Thoracic Surg. **18**:149 (April) 1949.

47. Van Hazel, W.; Holinger, P. H., and Jensik, R. J.: Adenoma and Cylindroma of the Bronchus, Dis. Chest **16**:146 (Aug.) 1949.

48. Goldman, A.: The Malignant Nature of Bronchial Adenoma, J. Thoracic Surg. **18**: 137 (April) 1949.

It is suggested that carcinoma of bronchogenic origin may at times arise in a mixed tumor type of bronchial adenoma. Carcinoid types of bronchial adenoma not infrequently show metastatic involvement of the mediastinal lymph nodes, and observations are presented to indicate that this may occur when the tumors have been present for as long as 30 years whereas the duration of symptoms is only two months.

The treatment of bronchial adenomas by lobectomy and pneumonectomy has given a 100 per cent five year cure in cases in which this period of time has elapsed since operation. From the observations on tumors of over 30 years' duration it would appear that several decades will be necessary to observe patients treated by this procedure before the recurrence rate can be definitely established.

A case of bronchial adenoma without signs of bronchial obstruction, concomitant with minimal tuberculosis, is reported by Fletcher and Lombard.[49] The patient's chief symptom was hemoptysis, and on the roentgenogram an area of infiltration just below the right hilus was observed and considered to be contralateral hilar node involvement from minimal tuberculosis of the upper lobe of the left lung. The diagnosis of the lesion was made by bronchoscopy and biopsy of a mass in the right lower lobe bronchus.

Fibrolipoma of Bronchus.—Benign tumors of the bronchus are not common, and fibrolipoma is probably the most infrequent. Lell [50] reports a case in which a lipoma of the right main bronchus originated at the level of the middle lobe bronchial orifice, obstructing both middle and right lower lobe bronchi. From the history, the growth probably was at least of two years' duration. The patient was aware of a peculiar type of breathing but never consulted a physician until what was apparently an acute respiratory tract infection developed. On the basis of the roentgen findings, which revealed atelectasis, bronchoscopy was done, and the true nature of the lesion was discovered and appropriate treatment instituted. Several bronchoscopic treatments were required to eradicate the local lesion completely.

Amyloid Tumors.—A clinical study of 15 patients on whom a diagnosis of amyloid tumor of the larynx, trachea or bronchi had been made is reviewed by Stark and New.[51] The pathologic features considered characteristic of the tumors are occurrence of homogeneous amyloid material, mainly in the form of flakes or concentric-layered masses, and a characteristic reaction of the amyloid material with one or more of the so-called amyloid stains. No concomitant disease considered of etiological significance was noted. The presenting signs and symptoms of amyloid tumor are dependent on the size and location of the lesion.

Classification of the tumors into the localized tumor-forming variety and the diffuse infiltrating variety is of significance in a determination of the type of treatment to be employed and of the prognosis after treatment. The localized tumor was surgically removed, with an excellent functional result. The diffuse lesion involving the subglottic region and the upper part of the trachea was removed, with immedi-

49. Fletcher, G. H., and Lombard, M. S.: A Case of Bronchial Adenoma Without Signs of Bronchial Obstruction: Concomitant with Minimal Tuberculosis, Am. J. Roentgenol. **61:** 209 (Feb.) 1949.

50. Lell, W. A.: Report of a Case of Fibrolipoma of Right Main Bronchus: Bronchoscopic Removal, Ann. Otol. Rhin. & Laryng. **58:**1124 (Dec.) 1949.

51. Stark, D. B., and New, G. B.: Amyloid Tumors of the Larynx, Trachea or Bronchi: A Report of 15 Cases, Ann. Otol. Rhin. & Laryng. **58:**117 (March) 1949.

ate grafting of the resultant denuded area. A permanent tracheostoma was avoided, and the functional results were excellent. The functional results obtained by treatment of the diffuse lesion involving the glottis proper were not so satisfactory. The prognosis as to life was excellent, except possibly for patients who had endobronchial lesions. The disease tended to be self limiting.

Tracheoplasty.—Because of the occurrence of malignant tumors of the trachea which may necessitate resection of a part of this structure, it is heartening to find that Grindlay and his associates [52] have carried out some experimental studies in this field.

Two dogs have been observed for more than two years and five dogs for a year and a half after resection of a portion of the trachea and anastomosis over special polyethylene (polythene®) tubes. The dogs are well and bronchoscopic examinations reveal few signs that the tubes, which are still in situ in six dogs, are injurious. The only abnormal findings concern two dogs, in one of which the tube was too large and in the other too small in diameter; in the former there is a short area of partial collapse of the trachea distal to the tube, and in the latter the tube fits loosely. One dog lost its tube about one year after operation; presumably the tube was too small in diameter and became loose. This dog is well, and the trachea at the site of anastomosis is marked only by slight irregularity.

Carcinoma of Bronchus.—An analysis of 200 cases in which a diagnosis of carcinoma was made on the basis of examination of smears of sputum or bronchial secretions was carried out by Woolner and McDonald.[53] In 190 cases a final diagnosis of bronchogenic carcinoma or pulmonary metastatic carcinoma was made. In four cases a carcinoma in the esophagus, larynx or trachea was demonstrated. In four cases the diagnosis was proved to be falsely positive. In the remaining two, the final diagnosis was uncertain.

Exfoliated carcinoma cells in sputum or bronchial secretions provided the only preoperative microscopic evidence of cancer in 29 of 74 cases of bronchogenic carcinoma in which surgical exploration was carried out. In 13 cases of bronchogenic carcinoma in which the lesion proved removable, a preoperative diagnosis of cancer was based on the cytologic characteristics of sputum or bronchial secretions. In six cases of Pancoast's tumor and in four cases of alveolar cell tumor there were carcinoma cells in the sputum.

Cytological examination of sputum is of great diagnostic value for patients suspected of having bronchogenic carcinoma and for whom bronchoscopic examination is contraindicated.

Farber and his co-workers [54] studied the cytology of sputum or bronchoscopically removed secretions in 100 cases of proved cancer of the lung. Sputum in 89 of the 100 cases was examined, and the diagnosis was made in 63, or 71 per cent. Bronchoscopically removed secretions were obtained in only 45 cases, and positive findings are reported in 26 (58 per cent).

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52. Grindlay, J. H.; Claggett, O. T., and Moersch, H. J.: Resection and Anastomosis of the Trachea: An Experimental Study, Ann. Otol. Rhin. & Laryng. **58**:1225 (Dec.) 1949.

53. Woolner, L. B., and McDonald, J. R.: Diagnosis of Carcinoma of the Lungs: The Value of Cytologic Study of Sputum and Bronchial Secretions, J. A. M. A. **139**:497 (Feb. 19) 1949.

54. Farber, S. M.; Benioff, M. A., and McGrath, A. K., Jr.: Diagnosis of Bronchogenic Carcinoma by Cytologic Methods, Radiology **52**:511 (April) 1949.

In discussing the early diagnosis of bronchogenic carcinoma, Looper and Cross [55] found that the commonest symptom is cough resulting from bronchial irritation. It was found in 82 per cent of their cases. Hemoptysis, wheezing and obscure chest pains should always make one suspect neoplasm. They employed the technique of cytological study of bronchial secretions and were able to make a diagnosis of carcinoma by cytology in 55 per cent of the cases and by bronchoscopic biopsy in 24 per cent.

Emphasis is placed on the importance of considering carcinoma as a form of emergency and the need for prompt diagnosis. If, therefore, bronchoscopic and roentgenologic evidence are lacking and the clinical picture is sufficiently suggestive of bronchogenic carcinoma, it is their opinion that an exploratory thoracotomy is indicated.

FOREIGN BODIES IN FOOD AND AIR PASSAGES

Congenital Anomalies.—Holinger and his co-workers [56] ably demonstrate by means of case presentations that congenital anomalies of the esophagus are often diagnosed through the accidental lodgment of foreign bodies in the esophagus. The commonest of these congenital anomalies in children are the congenitally short esophagus, congenital esophageal stenosis and congenital atresia of the esophagus with tracheoesophageal fistula. Stricture often follows the repair of tracheoesophageal fistula, and this likewise acts as a place of lodgment for esophageal foreign bodies. It is apparent that many similar congenital esophageal anomalies exist but are not manifested until later in life when complications other than or in addition to obstruction occur.

Foreign Bodies.—In an analysis of 50 cases of foreign bodies in the air passages, Bonnier [57] agrees with other observers that the symptoms and physical signs produced by foreign bodies may simulate those of bronchopulmonary diseases such as bronchial asthma, bronchopneumonia, tumors, infectious bronchitis and even tuberculosis. It is therefore important that a complete study be made in every case in which the diagnosis of the bronchopulmonary disease has not been firmly established or confirmed. By a complete study is meant a complete history, a careful physical examination, roentgenological studies, laboratory analyses and bronchoscopic exploration, followed, if necessary, by bronchographic studies.

Bronchoscopy is the only procedure that permits removal of the cause of the obstruction if due to a foreign body or that provides means of enlarging the lumen of a bronchus obstructed by a swollen mucosa, false membranes, debris, shreds of tissue or viscid secretions.

Magnetism in Removal of Foreign Bodies.—Electromagnets have seldom proved useful in the removal of foreign bodies in endoscopic work. With the development of the alnico® permanent magnet the problem of removal of ferrous foreign bodies from the lungs, esophagus, stomach and even duodenum has become a comparatively

55. Looper, E. A., and Cross, R. J.: The Early Diagnosis of Bronchogenic Carcinoma, Ann. Otol. Rhin. & Laryng. **58**:1113 (Dec.) 1949.

56. Holinger, P. H.; Johnston, K. C., and Greengard, J.: Congenital Anomalies of the Esophagus Related to Esophageal Foreign Bodies, Am. J. Dis. Child. **78**:467 (Oct.) 1949.

57. Bonnier, M.: A Brief Analysis of 50 Foreign Bodies in the Larynx, Trachea and Bronchi, Dis. Chest **16**:112 (July) 1949.

simple problem. Equen and his associates [58] report their results of five years' experience with the permanent alnico® magnet either as a cylinder fixed to a rigid ureteral catheter and thin enough to pass through a 4 mm. endoscope or modified to suit the individual case. They consider it the safest, quickest and the least traumatic method of removing ferrous foreign bodies. Often it is not known whether the foreign body is magnetic, and they have employed an adaptation of the "mine detector"—a Berman locator. This locator will settle the question in a few minutes.

The Jacksons [59] discuss the employment of magnets for the removal of foreign bodies from the air and food passages and emphasize that, while magnetic energy of any degree is absolutely harmless to human tissues apart from trauma, which is entirely avoided by gentleness and care, there is one precaution necessary, namely, that magnets made from cast alnico® alloy be handled with utmost care and gentleness, since they are extremely brittle. Should fracture of an alnico® magnet occur, the fragments would have to be removed with a soft iron rod of the same form as the magnet carrier but unmagnetized to avoid possible repulsion by like poles. They described four forms of vertebrated magnets which will enable the bronchologist to reach and enter practically all segmental bronchi and to pass the magnetic end in any peripheral direction as far as it is possible to work without risk of traumatizing the parietal pleura.

Laff [60] finds the alnico® magnet a useful addition to the endoscopic armamentarium, particularly for removal of magnetizable foreign bodies, and reports five cases. He finds it a simple and safe instrument and has employed it for the removal of open safety pins from the esophagus and stomach and straight pins from the periphery of the lung. Fluoroscopic aid plays an essential part in the manipulation of the alnico® magnet.

Although it has long been known that the aspiration of timothy grass causes a severe local bronchopulmonary reaction, the case reported by Judge and his associates [61] is of particular significance in that they demonstrated a local pulmonary gangrene as a result of this type of foreign body accident. The pathologic pattern, as demonstrated histologically, is one of progressive molecular necrosis with the formation of multiple cavities. With this specific complication in mind, they reiterate the necessity for immediate bronchoscopic removal of such foreign bodies.

Three cases in which a foreign body (one fish bone and two chicken bones) perforated the cervical esophagus and lodged in the thyroid gland are reported by Jemerin and Aronoff.[62] Instead of the retroesophageal or paraesophageal infection usually found after foreign body perforation of the esophagus, the infection in these cases was chiefly confined within one of the lateral lobes of the thyroid gland, embedded within which was the foreign body. External cervical drainage with recovery of the foreign body from the thyroid gland was performed in all these cases.

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58. Equen, M.; Roach, G., and Brown, R.: The Use of the Magnet in the Tracheobronchial Tree, the Esophagus, Stomach and Duodenum, Laryngoscope **59**:873 (Aug.) 1949.

59. Jackson, C., and Jackson, C. L.: Vertebrated Magnets for Removal of Foreign Bodies from the Air and Food Passages, Ann. Otol. Rhin. & Laryng. **58**:55 (March) 1949.

60. Laff, H. I.: Use of the Alnico Magnet in Bronchoscopy and Esophagoscopy, Laryngoscope **59**:186 (Feb.) 1949.

61. Judge, D. J.; Rice, E. C., and Davis, E. W.: Pulmonary Gangrene in a Child Following Aspiration of Timothy Grass, J. Pediat. **34**:87 (Jan.) 1949.

62. Jemerin, E. E., and Aronoff, J. S.: Foreign Body in Thyroid Following Perforation of Esophagus, Surgery **25**:52 (Jan.) 1949.

Special Reports

HEARING AIDS ACCEPTED BY THE COUNCIL ON PHYSICAL MEDICINE AND REHABILITATION OF THE AMERICAN MEDICAL ASSOCIATION

As of May 1, 1951

Audicon Models 400 & 415
Mfr., National Earphone Co., Inc.
20-22 Shipman St.
Newark 2, N. J.

Audivox Model Super 67
Mfr., Audivox, Inc.
259 W. 14th St.
New York 11

Aurex Model F
Aurex Model H
Mfr., Aurex Corporation
1117 N. Franklin St.
Chicago 10

Beltone Harmony Mono-Pac
Beltone Symphonette
Beltone Mono-Pac Model M
Mfr., Beltone Hearing Aid Company
1450 W. 19th St.
Chicago 8

Cleartone Model 500
Cleartone Regency Model
Mfr., American Sound Products, Inc.
2454 S. Michigan Ave.
Chicago 16

Dahlberg Model D-1
Mfr., The Dahlberg Company
2730 West Lake St.
Minneapolis 16

Dysonic Model 1
Mfr., Dynamic Hearing Aids, Inc.
1042 Atlantic Ave.
Brooklyn 16

Electroear Model C
Mfr., American Earphone Co., Inc.
10 E. 43rd St.
New York 17

Gem Model V-35
Gem Model V-60
Mfr., The Gem Ear Phone Co., Inc.
50 W. 29th St.
New York 1

Maico Atomeer
Maico UE Atomeer
Maico Quiet Ear Models G and H
Mfr., The Maico Company, Inc.
21 N. 3rd St.
Minneapolis 1

Mears (Crystal & Magnetic) Aurophone Model 200
1947-Mears Aurophone Model 98
Mfr., Mears Radio Hearing Device Corp.
1 W. 34th St.
New York 1

Micronic (Magnetic Receiver) Model 101
Micronic Model 303
Mfr., Micronic Company
727 Atlantic Ave.
Boston 11
(See Silver Micronic)

Microtone T-3 Audiomatic
Microtone T-5 Audiomatic
Microtone Classic Model T9
Microtone Model 45
Mfr., The Microtone Company
Ford Parkway on the Mississippi
St. Paul 1

National Cub Model (C)
National Standard Model (T)
National Star Model (S)
National Ultrathin Model 504
National Vanity Model 506
Mfr., National Hearing Aid Laboratories
815 S. Hill St.
Los Angeles 14

Otarion Model E-1S
Otarion Model E-2
Otarion Model E-4
Otarion Model F-1, F-2 and F-3
Otarion Model G-1 (Whisperwate)
Mfr., Otarion, Inc.
159 N. Dearborn St.
Chicago 1

Paravox Model J (Tiny-Myte)
Paravox Models VH and VL (Standard)
Paravox Model XT ('Xtra-Thin)
Paravox Model XTS ('Xtra-Thin)
Paravox Model Y (YM, YC and YC-7) (Veri-Small)
Mfr., Paravox, Inc.
2056 E. 4th St.
Cleveland 15

Radioear Permo-Magnetic Multipower
Radioear Permo-Magnetic Uniphone
Radioear All-Magnetic Model 55
Radioear Model 62 Starlet
Mfr., E. A. Myers & Sons
306-308 Beverly Road
Mt. Lebanon
Pittsburgh 16

Silver Micronic (Magnetic and Crystal) Models 202M and 202C
Mfr., Micronic Company
727 Atlantic Ave.
Boston 11
(See Micronic)

Silvertone Model 103BM
Mfr., National Hearing Aid Laboratories
815 S. Hill St.
Los Angeles 14

Distr., Sears, Roebuck & Company
925 S. Homan Ave.
Chicago 7

Silvertone Model M-35
Mfr., Micronic Company
727 Atlantic Ave.
Boston 11

Distr., Sears, Roebuck & Company
925 S. Homan Ave.
Chicago 7

Silvertone Model P-15
Mfr., W. E. Johnston Mfg. Company
708 W. 40th St.
Minneapolis 8

Distr., Sears, Roebuck & Company
925 S. Homan Ave.
Chicago 7

Solo-Pak Model 99
Mfr., Solo-Pak Electronics Corp.
Linden St.
Reading, Mass.

Sonotone Model 600
Sonotone Model 700
Sonotone Model 900
Sonotone Models 910 and 920
Sonotone Model 925
Mfr., Sonotone Corporation
Elmsford, N. Y.

Super-Fonic Hearing Aid
Mfr., American Sound Products, Inc.
2454 S. Michigan Ave.
Chicago 16

Televox Model E
Mfr., Televox Mfg. Company
1307 Sansom St.
Philadelphia 7

Telex Model 22
Telex Model 97
Telex Model 99
Telex Model 200
Telex Model 1700
Mfr., Telex, Inc.
Telex Park
Minneapolis 1

Tonamic Model 50
Mfr., Tonamic, Inc.
12 Russell St.
Everett 49, Mass.

Tonemaster Model Royal
Mfr., Tonemaster, Inc.
400 S. Washington St.
Peoria 2, Ill.

Trimm Vacuum Tube Model 300
Mfr., Trimm Distributors, Inc.
400 Lake St.
(P. O. Box 489)
Libertyville, Ill.

Unex Model A
Unex Midget Model 95
Unex Midget Model 110
Mfr., Nichols & Clark
Hathorne, Mass.

Vacolite Model J
Mfr., Vacolite Company
3003 N. Henderson St.
Dallas 6, Tex.

Western Electric Models 65 and 66
Mfr., Audivox, Inc.
259 W. 14th St.
New York 11

Zenith Model 75
Zenith Miniature 75
Mfr., Zenith Radio Corporation
6001 W. Dickens Ave.
Chicago 39

(All the accepted hearing devices have vacuum tubes.)

Accepted hearing aids more than five years old have been omitted from this list for brevity.

TABLE HEARING AIDS

Aurex (Semi-Portable)
Mfr., Aurex Corporation
1117 N. Franklin St.
Chicago 10

Precision Table Hearing Aid
Mfr., Precision Hearing Aids
5157 W. Grand Ave.
Chicago 39

Sonotone Professional Table Set Model 50
Mfr., Sonotone Corporation
Elmsford, N. Y.

Abstracts of Current Literature

Ear

ANATOMICAL BASIS FOR LABYRINTHINE DISTURBANCES RESULTING FROM DENTAL DEFORMITIES. M. W. YOUNG, Anat. Rec. (supp.) **106**:130, 1950.

Abnormalities of the dental apparatus have long been known to produce labyrinthine disturbances. Previous attempts to explain this causal relation on an anatomical basis have failed. Recent studies of the temporal bone and region by means of metal casts, roentgenograms and dyes have revealed lymphatic channels from the labyrinth to the middle ear and thence along the Eustachian tube to the retronasopharyngeal lymph nodes. The petrotympanic (Glaserian) fissure enters the mandibular fossa as an outlet from the middle ear and transmits the tegmen tympani, which contains lymph channels from the petrous bone. The tympanic bone, with similar lymph channels, forms the posteromedial boundary of the mandibular fossa adjacent to the tympanum and Eustachian tube.

A closed bite causes retrusion of the mandibular condyle with compression of the adjoining lymph channels. The outflow of the perilymph is thus diminished and the volume and pressure of the labyrinthine fluid increased. Cephalad-caudad roentgenograms of the skull show the prominent medial tubercle of the condyle compressing all the contiguous tissues.

Increased labyrinthine pressure from barometric effects and increased fluid volume ("hydrops of the inner ear") are well known etiological factors in various ear disorders.

Dehydration therapy (Furstenberg's) has proved beneficial in Ménière's syndrome. Mechanically opening the bite brings the mandibular condyle forward and relieves the compressed lymph channels, thus reestablishing the normal fluid balance and ear function.

FROM THE AUTHOR'S SUMMARY.

CLINICAL ELECTRONYSTAGMOGRAPHY. ARAM GLORIG and ALEXANDER MAURO, Ann. Otol. Rhin. & Laryng. **59**:146 (March) 1950.

Utilizing a standard portable electrocardiograph machine supplemented by a preamplifier, the authors successfully record nystagmus after caloric stimulation of the vestibular system.

The technique of stimulation of the horizontal semicircular canal, a modification of the method of Cawthorne, Hallpike and Fitzgerald, is described. Two active electrodes of a type used in electroencephalography are placed on the external canthi of both eyes, while a single ground electrode is placed on the forehead. In an effort to minimize voluntary eye movement, the patient should be made comfortable and urged to fix vision on a designated spot or small lamp 10 to 15 feet (3 to 4.6 meters) away.

Glorig and Mauro state that an advantage of objective recording of nystagmus is the establishment of a permanent record which permits detailed study of wave form, frequency and time duration.

STEELE, Kansas City, Kan.

INNER EAR DEAFNESS OF SUDDEN ONSET. JOHN R. LINDSAY and JACOB J. ZUIDEMA, Laryngoscope **60**:238 (March) 1950.

Sixteen cases of unilateral inner ear deafness of sudden onset with or without vestibular symptoms and three cases of bilateral inner ear disturbance associated with ocular inflammations are presented. Of the 16, there were only four with a definite cause (suppurative labyrinthitis, embolus, syphilis and mumps). As many of the 12 remaining were young healthy adults, vascular disturbances would not seem to have been the cause. A toxic involvement of the labyrinth, perhaps from a virus, seemed the most likely cause. Likewise the cases of bilateral inner ear disturbance associated with inflammatory ocular disease were presumably toxic in nature.

HITSCHLER, Philadelphia.

THE MANAGEMENT OF TINNITUS. VICTOR GOODHILL, Laryngoscope **60**:442 (May) 1950.

Goodhill's report is a thorough and lucid survey of tinnitus. Tinnitus cerebri is distinguished from tinnitus aurium, and the latter is divided into subjective and objective tinnitus. The former (subjective tinnitus) is the commoner and must be considered from the standpoint of anatomic location, pathological lesions and psychosomatic aspects. Treatment is outlined with emphasis on the psychosomatic factors, which are very important and are sometimes neglected by the otolaryngologist.

HITSCHLER, Philadelphia.

THE LOCAL APPLICATION OF "SULFAMYLON" (PARA [AMINOETHYL]-BENZENE SULFONAMIDE HYDROCHLORIDE) IN OTITIS EXTERNA AND CHRONIC OTITIS MEDIA: A SECOND REPORT OF 164 INFECTIONS IN 122 PATIENTS. J. W. MCLAURIN, Laryngoscope **60**:480 (May) 1950.

Otitis externa and chronic purulent otitis media are often helped greatly by the use of sulfamylon® (paraaminomethyl benzene and sulfonamide). This substance acts against many of the bacteria (Pseudomomas aeruginosa, Staphylococcus aureus, Klebsiella pneumoniae, alpha hemolytic Streptococcus and Escherichia coli) so commonly associated with these conditions. After the ear canal is thoroughly cleaned, a 1 per cent solution is left in the ear for five minutes. This treatment is repeated in 48 hours. Usually there is rapid improvement. If there is doubt as to the causative organism, smears must be taken and cultures grown. Fungus and many organisms are not sensitive to sulfamylon.® In these cases, of course, different treatment must be instituted.

HITSCHLER, Philadelphia.

EXTERNAL OTITIS: IV. CYTOLOGIC STUDY OF SECRETIONS. BENJAMIN H. SENTURIA, JOHN I. MATTHEWS and BERNARD C. ADLER, Laryngoscope **60**:577 (June) 1950.

Secretions of various ear infections differ cytologically and bacteriologically. A study of them is valuable in diagnosis. In external otitis (except the circumscribed) one sees many epithelial cells and bacteria but no lymphocytes. On the other hand, in otitis media there are many neutrophils and lymphocytes together with mucus strands and some bacteria but only a few epithelial cells. Details of other aural conditions and methods of procedure are included.

HITSCHLER, Philadelphia.

FACIAL PARALYSIS IN OTOLOGY. J. BROWN FARRIOR, South. M. J. **41**:348 (April) 1948.

Farrior states that the timely and accurate management of facial paralysis will result in maximal recovery and minimal residual deformity, whereas delay and inexpert management will leave a life long stigma on the patient and the surgeon. The nerve in its course through the temporal bone is considered in three segments, the labyrinthine, or petrosal, segment, which extends anteriorly and laterally to include the geniculate ganglion; the intratympanic segment, situated on the medial wall of the middle ear between the anterior half of the horizontal semicircular canal and the oval window, and the vertical segment, which extends from the middle of the horizontal semicircular canal to the stylomastoid foramen. Diagnostic localizing symptoms following injury in the various segments of the nerve are discussed in some detail.

The responses to faradic and galvanic stimulation are the most reliable guides to the extent of damage to the nerve. The loss of response to faradic stimulation indicates severe injury or complete section of the nerve. This reaction of degeneration usually occurs within 72 hours, but in rare cases response to stimulation may persist for two weeks. The muscles of the face will respond to galvanic stimulation as long as they are contractile. If there is no response to galvanic stimulation, operation on the facial nerve is not indicated and the facial deformity should be treated by plastic reconstruction. Intratemporal operations on the facial nerve include simple decompression, decompression and end to end anastomosis of a severed nerve, decompression rerouting and end to end anastomosis and decompression and autogenous nerve grafting. Cases are reported in which paralysis followed basilar skull fracture, acute otitis

media and mastoiditis, acute suppurative mastoiditis, chronic suppurative otitis media and mastoiditis and surgical injury. Facial paralysis following the fenestration operation and paralysis due to Bell's palsy (neuropathy of the facial nerve due to pressure) are considered briefly. The article contains 20 references.

SINGLETON, Dallas, Texas.

ATYPICAL SINUS THROMBOSIS. M. TAMARI, A. KOSITSKY and G. GUEMMER, Eye, Ear, Nose & Throat Monthly **28**:595 (Dec.) 1949.

The authors present reports of two patients with atypical lateral sinus thrombosis. Notable were the absence of pyemic symptoms and the presence of intact drums and hearing within normal limits associated with the finding of large bony defects on x-ray examination. The obvious disproportion between the clinical signs and symptoms and the extensive destructive process found on operation in these two patients is emphasized. The cases are described in detail.

JENNES, Waterbury, Conn.

ELECTRIC ACTIVITY OF THE SEMI-CIRCULAR CANALS, SACCULE AND UTRICLE IN THE FROG. A. LEDOUX, Acta oto-rhino-laryng. belg. **3**:335, 1949.

Ledoux studied the electric potentials of the labyrinth and the saccular and utricular nerves in the isolated head of the frog, after dissection of the inner ear. The head was placed on a turntable allowing rotations in all frontal and lateral directions. The action potentials were registered on a screen with a cathodic oscillograph and also amplified in a loud speaker. The following results are reported: The nerves of the three semicircular canals spontaneously produce asynchronous discharges of electric potentials of 10 to 20 microvolts for 2 to 3 hours in the isolated head. These discharges are found regardless of the method of opening of the labyrinthine capsule, the position of the head and the degree of moisture of the preparation. Ledoux studied the variations of electric potentials of these nerves in response to gradual changes in the position of the head, rotation, angular acceleration, sudden stop, cold and warm water and galvanic current stimulus. He found that the responses in the horizontal and vertical semicircular canals are opposite during the rotary and caloric stimuli; i. e., these stimuli cause excitation of the horizontal canals and inhibition of the vertical canals when the endolymph flows toward the ampulla.

The saccule responds only to mechanical (acoustic) vibrations, and the saccular nerve reproduces the vibration frequency up to 500 cycles per second. The click of a vibrator produces in the nerve a wave in which one differentiates the microphonic effect of the saccular macula and the action potential. The utricle responds to changes of position of the head around a horizontal axis and to mechanical vibrations.

HERSON, Chicago.

MICROPHONIC RESPONSE OF THE AMPULLAE OF SEMICIRCULAR CANALS IN PIGEONS. M. VAN EYCK, Acta oto-rhino-laryng. belg. **3**:459, 1949.

Van Eyck studied the production of the microphonic potential currents in the fenestrated semicircular canal of 32 pigeons in which the cochlea had been previously removed and the middle ear left intact. Stimulation by sound frequencies of 100 to 3000 cycles per second generated microphonic potentials in the fenestrated semicircular canal. These potentials are strikingly analogous with cochlear microphonic potentials; they have the same latency time, the same correlation between frequency of stimulus and frequency of response and the same deformation of the curve above a frequency of 1000 cycles per second.

Cocainization or destruction of the ampulla supresses the production of these potentials. Since different leads produce opposite phases on each slope of the ampullar crista, the author suggests that the latter is the point of origin of the microphonic response of the ampulla. No microphonic response was found in an intact (nonfenestrated) semicircular canal after analogous sound stimulation.

HERSON, Chicago.

SYMPOSIUM: THE VESTIBULAR APPARATUS. Acta oto-rhino-laryng. belg. **4**:163, 1950.

This symposium is composed of works by Belgian and other authors and comprises the following 34 articles: Anatomy and Compared Physiology of the Peripheral Vestibular Apparatus, by E. Huizinga (Groningen); Origin and Unity of Various Vestibular Functions and the Acoustic Function, by S. H. Mygind (Copenhagen); Anatomy and Pathology of the Peripheral Vestibular Apparatus, by P. G. Gerlings (Amsterdam); Labyrinthine Liquids, by A. Ledoux (Liége); Physiology of the Semicircular Canals and Otolithic Apparatus, by P. Arslan (Padua); Action Potentials of the Vestibular Nerve, by A. Ledoux (Liége); Electric Response of the Ampullae of Semicircular Canals in Pigeon, by M. van Eyck (Brussels); Functional Changes of the Cochlea and Vestibule After Surgery of Vestibule, by G. Cornelli (Milan); Anatomy and Physiology of the Vestibular Pathways, by van Laere (Courtrai); Physiology of the Human Vestibular System, by P. van Gehuchten (Louvain); Vestibular Reflexes and Cerebellum, by A. M. di Giorgio (Turin); The Cortical Vestibular Center, by M. A. Gerebtzoff (Liége); Vestibular Disorders in Temporal Lobe Tumors Before and After Surgery, by F. Rohmer and G. Greiner (Strasbourg); Effects of Unilateral Labyrinthectomy, by G. G. Rademaker (Leyden); Optokinetic Nystagmus and Cortical Oculorotary Centers, by E. Claes (Brussels); Streptomycin Poisoning and Its Localization by Functional Tests, by P. Lansberg (Zutphen); Vestibular Disorders in Diseases of the Central Nervous System, by L. Descamps (Charleroi); Relations Between Autonomic Nervous System and the Labyrinth, by A. Montandon (Geneva); Changes of the Endolabyrinthine Pressure in Cat and Rabbit During Anaphylactic and Histaminic Shock, by P. Filippi (Genoa); Vestibular Function, by F. Crabbe (Brussels); Postural Nystagmus of Peripheral Origin, by P. G. Gerlings (Amsterdam); The Caloric Test, by L. B. W. Jongkees (Utrecht); The Barany-Brunings Test, by de Burnonville (Brussels); The Caloric Tests of Barany, by L. Descamps (Charleroi); Hearing and Static Apparatus Examination by Minimal Vestibular Tests, by F. Kobrak (London); Rotary Tests, by P. Scheins (Brussels); Cupulometry, by A. A. S. van Egmond (Utrecht); Galvanic Test, by P. E. Hennebert (Brussels); Evaluation of the Galvanic Test, by S. Bellens (Malines); Vestibular Chronaxies, by G. Bourguignon (Paris); Chronaxy of the Eighth Cranial Nerve, by M. Rius and N. Ferrero (Montevideo); The Vestibular Sound Test and Its Clinical Application, by van Caneghem (Bruges); Standardisation of the Vestibular Tests, by E. Wodak (Tel Aviv), and Radiographic Exploration of the Vestibular Apparatus and Petrous Bone, by C. Chausse (Paris).

HERSON, Chicago.

Larynx

ARYTENOIDECTOMY: A PRELIMINARY STUDY. JOHN A. MURTAGH, F. CORBIN MOISTER and JOHN MILNE, Laryngoscope **60**:330 (April) 1950.

Changes in the circulating red blood cell mass and the physiology of respiration were recorded before and after removal of laryngeal obstruction due to bilateral cord paralysis following subtotal thyroidectomy. The obstruction was removed by the Kelly technique as modified by Woodman. The results showed marked improvement in physical endurance and changes in respiration and the red blood cell indexes toward normal. Also it is suggested that there is an increase in the hemoglobin and in the actual size of the red blood cells as a compensatory mechanism to transport more oxygen to the body.

HITSCHLER, Philadelphia.

ENDOSCOPIC TREATMENT OF THE PARENCHYMAL PULMONARY SUPPURATIONS. GUY ARNAUD, Acta oto-rhino-laryng. belg. **3**:488, 1949.

Eighty cases studied since 1946 at the Laennec Hospital in Paris are reported. In cases of recent pulmonary abscess favorable results were obtained with bronchoscopic treatment associated with systemic treatment; in cases of chronic abscess bronchoscopy was found useful in preparing the patient for surgery. In either case, it is advocated for systematic use by Arnaud. In 45 recent cases (of less than two months' duration) endoscopic treatment produced clinical cure

with complete clearing of the lungs in 20 cases as indicated by roentgenogram, and clinical cure with persistence of noncavitary pathological conditions according to roentgenologic evidence was obtained in nine cases. In 11 cases roentgenograms showed that cavitation persisted although clinical cure was obtained. In 35 cases of chronic abscess total roentgenologic and clinical cure was obtained in one patient, clinical cure with persistence of noncavitation shown by roentgenogram in seven patients and cavitation in five. The remaining 22 failed to recover or showed recurrences of the abscess. Streptomycin, penicillin and sulfonamides were used concurrently. Penicillin was also injected directly in the cavity after the patient was placed in the posture corresponding to the location of the abscess.

HERSON, Chicago.

Nose

PHYSICAL BASIS OF NASAL OPERATIONS. A. C. HILDING, California Med. **72**:103 (Feb.) 1950.

Hilding presents an interesting discussion of nasal physiology as applied to different parts of the nose—external nose, vestibule, septum, turbinates, sinuses—and makes comments and suggestions based on his own experimental work in this field. The main thesis is that no operation should be done on any part of the nose without first considering at length the physiology of that part, to the end that normal function shall be restored as far as possible.

SELTZER, Philadelphia.

THE MANAGEMENT OF NASAL FRACTURES. GILBERT ROBERTS, Laryngoscope **60**:557 (June) 1950.

There has been little attention directed recently toward the management of nasal fractures. Many of these are handled poorly, with resulting deformity. Knowledge of nasal anatomy and most careful operative technique are necessary to produce the best possible results. Several such procedures are described together with the proper management of nasal fractures in general.

HITSCHLER, Philadelphia.

TECHNIC OF POSTNASAL PACKING FOR UNCONTROLLABLE EPISTAXIS WITH "KITE-TAIL" TAMPON. ARMANDO G. FAVAZZA, New York J. Med. **50**:1240 (May 15) 1950.

Favazza says that competent rhinologists are at times unable to find the source of bleeding in nasal hemorrhages when these are located in some spot other than the area of Hesselbach (*sic*). Perhaps he means Kiesselbach's spot near the anterior portion of the nasal septum. He rightly refers to hypertension as a potent cause of uncontrollable bleeding. (This is a sort of safety valve to "let off steam" so that "the pipes" will not break.)

The technique is not different from that described in many textbooks, namely, to introduce a catheter through the wider side of the nose, pull it through the nasopharynx out of the mouth and then tie a thread to the catheter and a gauze roll to the other end of the thread. Favazza recommends oxidized cellulose gauze, which ordinarily disintegrates in 48 hours. He has seen no infections from this procedure but does not mention possible invasion of the Eustachian tubes. Moreover, he pierces the tip of a small rubber catheter with an ordinary sewing needle threaded with a strong cotton about 24 inches (70 cm.) in length. This is quite unnecessary and makes passing of the catheter more difficult than it needs to be.

VOORHEES, New York.

TETANUS RESULTING FROM A FOREIGN BODY IN THE NOSE. MATTHEW LINKER, IRA M. ROSENTHAL, and JOSEPH GOLOMB, New York J. Med. **50**:1620 (July) 1950.

The authors, who report this case from Fordham Hospital, New York City, say that they have been unable to find in the literature any previously recorded instance of tetanus from nasal foreign body. On Aug. 12, 1948, a 17 month old Negro child was admitted with a purulent profuse nasal discharge, dysphagia, anorexia, and weakness. Nothing in the history explained the symptoms. There was no evidence of wound infection anywhere. His temperature was

around 100 F., and he had tachycardia. Frequent irrigations brought a paper match stick out of one nostril. Culture showed Escherichia coli, Staphylococcus aureus and Clostridium tetani from the match stick. Streptomycin and penicillin had been given before the tetanus was diagnosed. Thereafter, large doses of tetanus antitoxin were administered. Improvement, however, was slight, and he died on August 17, the fifth day after admission. Autopsy was not permitted.

The importance of routine immunization of children against tetanus is stressed, and the authors say, "It is possible that with earlier diagnosis tracheotomy, tribromoethanol, curare or mephenesin might have contributed to a more satisfactory result in this case.

VOORHEES, New York.

HAY FEVER, HUMIDITY AND SINUSITIS. MAX UNGER, New York J. Med. **50**:1727 (July) 1950.

Unger reviews the physiology of respiration and the effect of weather (temperature and humidity) on the respiratory tract. Absolute humidity is the amount of water the air can hold; relative humidity is the percentage of water present in the air in proportion to the amount of water the air can hold. Newspapers and the radio inform us as to relative humidity. Hay fever sufferers have nasal symptoms during the cooler months, probably from a chronic sinusitis. As for pollens which should be found in nasal secretions, "I never found any pollens in the many slides examined," but he did find pathogenic bacteria, pus cells, and desquamated sinus cells. "It must not be inferred that low humidity cures hay fever symptoms; it only alleviates the symptoms." In New York City, many patients never see a blade of grass for weeks, and yet they have sneezing, watery eyes, running nose, cough, and asthmatic attacks during the summer and early fall months. Many find relief in climates with vastly greater pollen air content than in this great city. Bacterial discharges from the nose are irritating to the mucous membrane cells and therefore set up an excessive activity of these cells which continues until the irritation lessens. With increased altitude, both temperature and humidity fall, hence the patient feels better. On occasion, some patients find certain climates too dry.

VOORHEES, New York.

RECONSTRUCTION OF THE NASOLABIAL AREA BY COMPOSITE GRAFT FROM THE CONCHA. J. M. CONVERSE, Plast. & Reconstruct. Surg. **5**:247 (March) 1950.

Converse reports that when a carcinomatous growth is adequately excised from the nasolabial fold, a defect results at the base of the ala and the adjoining part of the cheek. He has devised a method of operative procedure by which the defect can be immediately repaired. This is done by using a graft taken from the ear. The graft includes cartilage from the concha of the ear and the overlying skin of the posterior surface of the ear. After the fatty tissue has been removed, the suitably shaped composite graft is sutured into the defect with 0 to 5 absorbable surgical suture U.S.P. Shrinkage of the graft has been observed to depend on the size and the time required for revascularization.

SELTZER, Philadelphia.

THE SELTZER CIRCULAR RHINOPLASTIC SAW. ALBERT P. SELTZER, Plast. & Reconstruct. Surg. **5**:261 (March) 1950.

Seltzer presents his recently devised instrument for detaching the superior maxillary process to narrow the bridge of the nose when doing a rhinoplasty. A variety of techniques have been used for this purpose, all of which are liable to cause injury to the surrounding soft parts. The author's saw resembles in design a pistol, with the small circular saw attached to the tip of the hollow barrel through which a wire passes carrying the electric circuit to start the saw. The saw makes 10,000 revolutions a minute and is provided with a guard at one side to prevent injury to the surrounding tissue. Special steps are taken in preparing the field; a single long incision is made instead of two short ones. This is done to make room for the use of the saw after the periosteum is elevated. The operation is described in detail, and four photographs of the instrument are presented.

SELTZER, Philadelphia.

NEW TYPE OF NASAL SPLINT. F. L. ASHLEY and E. D. KING, Plast. & Reconstruct. Surg. **5**:536 (June) 1950.

Ashley and King describe a metal splint devised by them for use both for fracture of the nasal bones and for other rhinoplastic operations. The splint is made of cranial plate tantalum, which is cut according to a pattern made to suit the needs of the patient and folded in the midline to form equal halves. After the edges have been smoothed with a rasp and bent slightly outward, the splint is placed over the nose, which has been covered with adhesive tape, then molded to fit the nasal contour. It is finally fixed firmly in place with adhesive applied so that the nasal tip remains exposed. The authors consider that the fixation is as firm as with a plaster cast and that the metal is rust proof and can be used for successive operations more or less indefinitely. Photographs illustrate the appearance and adjustment of the splint.

SELTZER, Philadelphia.

NASAL ALLERGY ASSOCIATED WITH SINUS DISEASE. L. E. DARROUGH, Texas J. Med. **43**:285-286 (Aug.) 1947.

Darrough, in discussing nasal allergy associated with sinus disease, states that allergy is an "altered reactivity" which is presumed to be an immune reaction resulting from a previous exposure to a particular substance or allergen. He states that nasal allergy is one of the most frequent conditions with which the rhinologist is confronted; he estimates that 75 per cent of all patients having chronic nasal disturbances have an allergic background. Many chronic sinus cases are a combination of allergy and infection; in such conditions both the allergy and the infection require treatment if satisfactory results are to be obtained; the necessary studies and treatment should be carried out by the rhinologist. If allergy is suspected, the appearance of the nasal mucosa, the presence of polypoid changes, the character of the secretion and the cellular content of the secretion are all important aids in arriving at a diagnosis, and much can be learned from a careful history of the individual case. Definite seasonal symptoms suggest a pollen sensitivity. Symptoms beginning with the advent of cold weather suggest an inhalant such as house dust. Constant symptoms suggest food or an inhalant such as house dust. Intracutaneous skin tests and elimination diets are often very helpful in arriving at an accurate diagnosis of the particular substance causing the reaction. Treatment should be directed toward eliminating, when possible, the offending substance; pollen and dust extracts should be used if indicated; weak dilutions are recommended. If indicated, surgical intervention is advised. Both the allergy and the infection require treatment when the two conditions coexist.

SINGLETON, Dallas, Tex.

MODERN TRENDS IN DIAGNOSIS AND TREATMENT OF PARANASAL SINUS DISEASE WITH PARTICULAR REFERENCE TO ALLERGIC MANIFESTATIONS. E. KING GILL, Texas J. Med. **43**:330 (Sept.) 1947.

Gill, in discussing the modern trends in the diagnosis and treatment of paranasal sinus disease with its allergic manifestations, states that for more than 40 years there had been no completely satisfactory explanation for the many failures in sinus surgery. He says that it was with the development of a better understanding of nasal physiology, beginning some 20 years ago, that a new, more intelligent, and conservative phase of nasal and sinus treatment was begun. A knowledge of the general plan and action of the autonomic nervous system for a plausible explanation of the altered physiology of the allergic response is stressed and discussed briefly.

The author further states that an accurate diagnosis of pathological conditions in the nose and paranasal sinuses involves a careful consideration of many diagnostic points, e. g., a careful history, evaluation of symptoms, recognition of objective changes in the nasal mucosa, roentgen examination of the sinuses, nasal cultures for bacterial diagnosis, and cytologic examination of the nasal secretions for cell type determination. In cytologic studies repeated examinations may be necessary. To interpret properly the smears and fit them into the clinical history the rhinologist should examine the nasal smears himself. The use of sulfonamides, penicillin, tyrothricin, streptomycin, hapamine® (a chemical combination of histamine and despeciated horse serum globin—contains no free histamine), diphenhydramine, tripelennamine

and pyranisamine in the treatment of nasal and sinus disease is discussed in some detail. In his summary, the author concludes his article with the statement that "no antigenic substance, sulfa compound, or antibiotic should be expected to correct nasal disabilities due to deviated septums, septal spurs, cystic turbinates, or other physical defects which surgery alone can help." The article contains 19 references.

SINGLETON, Dallas, Tex.

POST OPERATIVE LOSS OF TISSUE OF THE NASAL ALAE. JAIME SALA LOPEZ, An. oto-rino-laring. **20**:1, 1950.

In loss of the tissue of the alae, particularly after removal of growths, Lopez advocates the grafting of a V-Y flap on the affected side. By this method he is able to restore the normal contour of the rim of the nose. The technique is very simple and is described in detail.

PERSKY, Philadelphia.

PAPILLARY RHINO SINUSITIS. MANUEL GONZÁLEZ LOZA, R. MAISONNAVE and JOSÉ V. BENITO Y NAVARRO, Gac. oto-laring. Argent. **1**:9 (July) 1950.

The authors present two cases of nasal papillomas. Primarily benign, these growths may assume malignant characteristics. Histological examination is the only conclusive criterion for diagnosis. Conservative surgical treatment is advocated. Radiation is of value only when there is an extension of the pathological growth into the larynx.

PERSKY, Philadelphia.

TREATMENT OF PNEUMOCOCCIC MENINGITIS WITH MASSIVE DOSES OF SYSTEMIC PENICILLIN. HARRY F. DOWLING, LEWIS K. SWEET, JAY A. ROBINSON, WILLIAM W. ZELLERS and HAROLD L. HIRSCH, Am. J. M. Sc. **217**:149 (Feb.) 1949.

In an effort to avoid the irritative arachnoiditis of intrathecal administration of penicillin, the authors treated 21 patients with pneumococcic meningitis by injections of 1,000,000 units of penicillin intramuscularly every two hours. Only three of the patients received a single intrathecal injection of the drug; 13 patients received sulfonamides in addition. There were eight deaths, or 38 per cent, as compared with a fatality rate of 62 per cent of 66 patients treated with smaller doses of penicillin given systemically and repeated intrathecal injections of penicillin. Small amounts of penicillin were present in the spinal fluid of all patients within 60 minutes after intramuscular injections were begun. After eight hours the spinal fluid concentrations were between 0.08 and 1.25 units per cubic centimeter.

Of the patients who recovered, the temperature dropped more rapidly and the duration of pleocytosis was shorter among those who received massive systemic doses than among those who were given repeated intrathecal injections. No untoward reactions to these massive doses were observed.

MADOW, Philadelphia [ARCH. NEUROL. & PSYCHIAT.]

Miscellaneous

EARLY AMBULATION IN NOSE AND THROAT SURGERY. S. E. BARNETT, Eye, Ear, Nose & Throat Monthly **29**:19 (Jan.) 1950.

Barnett reports the use of *d*-amphetamine (dexedrine®) sulfate after surgery of the eye, ear, nose and throat to counteract the unpleasant side effects of preoperative narcosis and anesthesia and thus quickly restore the patient to his normal physiological state. This treatment results in earlier ambulation, shortens hospitalization and hastens postoperative recovery. A single dose of *d*-amphetamine is administered orally three hours postoperatively, the dose consisting of 5 mg. for children and 10 mg. for adults.

JENNES, Waterbury, Conn.

RATIONALIZATION OF AEROSOL THERAPY IN RESPIRATORY TRACT INFECTIONS. A. R. HOLLENDER, Eye, Ear, Nose & Throat Monthly **29**:28 (Jan.) 1950.

Hollender points out the erroneous impression left by the lay press concerning the curative value of penicillin aerosol therapy in infections of the respiratory tract. He emphasizes that

the use of this therapy to the exclusion of the other indicated measures will inevitably lead to unfavorable results. Articles in lay magazines have created a demand for inhalational therapy of sinusitis out of all proportion to the merits of this procedure. The results quoted have been more theoretical than actual and obviously have been taken from overenthusiastic and unscientific reports. The treatment has been heralded as a cure without due consideration for the indications presented by the various pathological processes. Irrespective of the method of administration, penicillin is ineffective in most cases of chronic sinusitis. Aerosol therapy should not be relied on to the exclusion of other indicated measures in infections of the respiratory tract. If adequate blood penicillin levels are unobtainable with inhalation of penicillin, the drug must be administered, in addition, by the parenteral route. Poor results with penicillin aerosol in indicated cases are attributable mainly to infrequency of administration, failure to augment the method with parenteral therapy and lack of attention to underlying or associated etiological factors.

JENNES, Waterbury, Conn.

THE PLACE OF THE OBLITERATIVE OPERATION IN FRONTAL SINUS SURGERY. EDWARD H. LYMAN, Laryngoscope **60**:407 (May) 1950.

Lyman's monograph is an excellent and comprehensive review of the history of obliterative surgery, showing the various operations proposed, their faults and advantages and why some were completely discarded while others or parts of others were retained. The present operations are then discussed. Cases are divided into three groups, each requiring a different operative procedure. Illustrative cases are presented.

HITSCHLER, Philadelphia.

INTRACRANIAL LESIONS SIMULATING FRONTAL SINUS INVOLVEMENT. CLARENCE W. ENGLER and SPENCER BRADEN, Laryngoscope **60**:451 (May) 1950.

Pain referred to the frontal area from an intracranial lesion may be mistaken for frontal sinusitis. The commonest pain-sensitive structures of the head are the arteries, parts of the dura and certain nerves. They can be divided into the supratentorial and infratentorial groups. Stimulation of the supratentorial group produces pain in the frontal region.

HITSCHLER, Philadelphia.

BLOOD DYSCRASIA IN OTOLARYNGOLOGY. JAMES HARA, Laryngoscope **60**:454 (May) 1950.

This paper includes a comprehensive review of the blood dyscrasias, showing particularly their relation to otolaryngology. Important data on etiology, pathology, signs, and symptoms and treatment of each are given. It is emphasized that repeated blood examinations are sometimes necessary for diagnosis.

The outstanding otolaryngological signs or symptoms of hemophilia are epistaxis and sudden vertigo or deafness; of primary polycythemia, epistaxis, increased coagulation time, headache, vertigo, tinnitus, fulness of ears, skin "red as roses in summer, blue as indigo in winter," and red blood cell count increased; of infectious mononucleosis, sore throat or swollen glands and positive reaction to heterophil antibody test; of agranulocytosis, redness and erosion of the mucous membrane and typical blood picture; of thrombocytopenic purpura, epistaxis, bleeding time prolonged, clot retraction prolonged, positive reaction to tourniquet test and normal coagulation time; of pseudohemophilia (Willebrand's disease), epistaxis, ecchymosis and prolonged bleeding time; of leukemia, bleeding from the nose, gums and mouth and cervical adenopathy, and of hereditary hemorrhagic telangiectasia (Randu-Osler-Weber's disease), ruby red telangiectasia of mucous membrane and skin and epistaxis.

HITSCHLER, Philadelphia.

HEMORRHAGE IN EAR, NOSE AND THROAT. LELAND G. HUNNICUTT, Laryngoscope **60**:551 (June) 1950.

Hunnicutt reviews the various standard methods and other methods learned from personal experience of controlling hemorrhage from the ear, nose and throat. Many valuable methods, some of which will probably be new to most physicians, are described.

HITSCHLER, Philadelphia.

POLIOMYELITIS-TONSILLECTOMY SURVEY—YEAR 1949. DANIEL S. CUNNING, Laryngoscope **60**:615 (July) 1950.

Dr. Cunning's completed report on the tonsillectomy-poliomyelitis question includes over 36,000 cases of poliomyelitis and nearly 100,000 cases of tonsillectomy compiled over a four year period. There was no definite causal relation found. However, it was concluded that tonsillectomy, or for that matter any elective operation, should not be performed during a poliomyelitis epidemic or any other epidemic and, conversely, in the absence of an epidemic, tonsillectomy should not be postponed during the summer months merely because poliomyelitis is apt to occur then.

HITSCHLER, Philadelphia.

ANESTHETIC PRACTICE IN PROLONGED SURGERY. GEORGE WALLACE, New York J. Med. **50**:444 (Feb. 15) 1950.

Wallace reports his observations from the Veterans Administration Hospital, Bronx, N. Y. In prolonged intracranial surgery the problems are to keep an open airway, adequate oxygenation, heat to the body, elimination of carbon dioxide and to avoid increased intracranial pressure (especially by drugs). Intrathoracic surgery poses even more difficult situations. One must avoid pulmonary decompensation by using artificial respiration ("controlled respiration"), in which the anesthetist takes over the breathing rhythm. Secondly, "compensated respiration" is recognized, wherein spontaneous respiration is maintained, but the anesthetist offers some assistance by increasing the bag pressure (closed anesthesia). One patient was thus observed for 9½ hours. Vascular responses are the best guide as to the patient's condition. The collapsed lung must be inflated from time to time to prevent postoperative atelectasis. Procaine is helpful in ameliorating many reflex changes that were heretofore disastrous to the patient. The "direct-writing electrocardiograph" is valuable for keeping track of the patient's cardiac rhythm. It "will eventually become standard equipment for all anesthetic procedures." One must recognize loss of body fluids and "electrolyte loss." The patients in the series reported in this article were each given from 1,000 to 5,500 cc. of blood. Before operation two infusions were given into the leg veins through 15 gage needles. It is now possible for a patient to undergo many hours of surgery without loss of life from anesthesia.

VOORHEES, New York.

FACIAL NERVE PARALYSIS IN INFECTIOUS MONONUCLEOSIS. BENJAMIN R. ALLISON, New York J. Med. **50**:592 (March 1) 1950.

Of 1,085 reported cases of mononucleosis there was an associated facial paralysis in only seven. This report concerns a white woman aged 39, who felt ill and complained of a stiffness in the right side of her neck with sore throat. Four days later the oral temperature was 100 F. There were redness and swelling of the right tonsil and pharynx, with palpable lymph nodes in the right anterior and posterior side of the neck. Movement of the head caused pain and spasm of the right sternomastoid muscle. There was enlargement of the glands in the right axilla. The patient vomited, her throat became more painful and her temperature rose to 102 F. White patches appeared in the pharynx. Mononucleosis was suspected from the results of the blood examination. There was no rash, and the liver and spleen were not palpable. On the twelfth day she noticed weakness in the muscles of the right side of the face, but there was no disturbance of hearing or taste. Neurological examination revealed no great abnormality. Hepatitis developed on the eighteenth day, with icterus and tenderness in the right upper quadrant. The sedimentation rate was 10 mm., and the Kahn reaction was negative. In about two months the facial condition cleared.

Allison gives eight references to case reports and offers a table showing the results of six "blood counts" between January 6 and February 17, all of them high in lymphocytes with many atypical forms.

VOORHEES, New York.

THE TREATMENT OF ACUTE HERPETIC GINGIVOSTOMATITIS WITH OZONIDE OF OLIVE OIL. LOUIS S. GOLDSTEIN, New York J. Med. **50**:1252 (May 15) 1950.

During the poliomyelitis epidemic of 1949, Goldstein encountered 54 children with spongy, bleeding, dirty gray lesions on the gums, cheeks, tonsils and soft palate. The temperature varied from 101 to 104 F. with malaise, irritability, pain on taking food and on swallowing, insomnia and glandular swellings in the neck. Foul breath caused the mother to call the physician. The fingers became contaminated and sore from sucking. No abscesses were seen. Goldstein recommends ozonide of olive oil as a nontoxic, soothing, bland, deodorant germicide. There were no allergic reactions or other untoward symptoms or signs. "Ozonide of olive oil is nonselective and capable of killing both aerobic and anaerobic bacteria."

VOORHEES, New York.

THE USE OF SKIN FLAPS IN THE REPAIR OF FACIAL DEFORMITIES. V. H. KAZANJIAN, Plast. & Reconstruct. Surg. **5**:337 (April) 1950.

Kazanjian includes in this paper on the relative value of the use of skin grafts in facial repair a brief description, with illustrations, of operations to remove large pigmented nevi over the bridge of the nose. The text is limited, but there are adequate photographs to show both the methods of immediate operations and the later results.

SELTZER, Philadelphia.

A CASE OF RECONSTRUCTION OF THE MAXILLA FOLLOWING RESECTION FOR CARCINOMA OF THE ANTRUM. J. M. CONVERSE and B. SMITH, Plast. & Reconstruct. Surg. **5**:426 (May) 1950.

In Converse and Smith's operation for carcinoma of the antrum, operation for maxillary reconstruction was undertaken two years and five months after the primary radical excision. The purpose of the operation was to correct the sagging of the eyeball, which was also exophthalmic, and to elevate the flattening of the face caused by the earlier removal of the zygoma. The floor of the orbit, the upper part of the maxilla and the zygomatic area were repaired by using bone grafts from the ilium. The graft material removed from the crest of the right side was composed of the inner table of the bone together with the cancellous tissue. The case is reported in detail, and a clear description of the operative procedure is given. A number of illustrations adds considerably to the understanding of the presentation.

SELTZER, Philadelphia.

GROWTH OF YOUNG HUMAN AUTOGENOUS CARTILAGE GRAFTS. S. S. DUPERTUIS, Plast. & Reconstruct. Surg. **5**:486 (June) 1950.

The successful results of considerable experimental study in animals of the question whether or not young autogenous cartilage grafts would grow in the course of time have led to using this method in human subjects. Dupertuis reports three cases, two involving depression of the nasal bridge, of young subjects, in whom his technique has been successful. Six years after the great implantation, direct measurement indicated that it had grown at about the same rate as the surrounding tissues, thus maintaining a uniformity in the size of the parts. The third case is one of Treacher-Collins' syndrome, in which similar use of young autogenous graft material was made successfully. The materials employed were double thickness cartilage with the perichondrium removed. Absence of perichondrium did not interfere with the growth of the cartilage graft. Several excellent photographs illustrate the article.

SELTZER, Philadelphia.

REPAIR OF EXTENSIVE PALATAL DEFECTS WITH SKIN TUBES. J. G. KOSTRUBALA, Plast. & Reconstruct. Surg. **5**:512 (June) 1950.

Contrary to the general opinion that skin is not suitable to use for restoration of defects of the palate, Kostrubala has demonstrated in a series of patients with extensive palatal loss that skin can be used successfully in these conditions. A skin tube is derived from a nonhairbearing

surface and inserted through an artificial opening into the mouth made in the general region about the nose. These openings can be repaired later, and their use avoids the difficulties of trying to operate through the mouth opening when the tube also passes through it. The author suggests that a better method may be found but until then his own seems preferable to others used at present.

SELTZER, Philadelphia.

MICROSCOPIC GUIDANCE IN THE TREATMENT OF SKIN CANCER. H. A. SZUJEWSKI, Plast. & Reconstruct. Surg. **5**:524 (June) 1950.

To assure the removal of all malignant tissue in cancer of the skin, the author presents a method which allows immediate microscopic control of the material removed by surgery. Three steps are taken in following the technique: the skin of the operative field is chemically fixed *in situ* (dichloracetic acid was used), the fixed area is then excised and the excised material is immediately examined microscopically. Successive excisions are made until no sign of malignant growth appears in the microscopic sections. No anesthetic is required as the fixative serves this purpose and at the same time acts as a hemostatic. A case history is presented which illustrates the treatment of a skin cancer on the nose near the nasolabial fold and the presence of a secondary growth on the same side near the angle of the eye. The author considers his method both reliable and accurate but grants at the same time that it has definite limitations. Illustrative photographs are presented.

SELTZER, Philadelphia.

SMALL TRIANGULAR FLAP OPERATION FOR THE PRIMARY REPAIR OF CLEFT LIPS. J. B. BROWN and F. MCDOWELL, Plast. & Reconstruct. Surg. **5**:892 (May) 1950.

Brown and McDowell describe their method for repair of single-cleft lips, by which a triangular flap is turned down from the margin of the ala into the defect in the lip. The method permits the use of thicker vermilion tissue on the alar side, and in this way the full thickness on the other side of the cleft is matched, with the result of a lip of more normal contour. Full details for the operative procedure are given, and a number of excellent photographs add to the clarity of the description.

SELTZER, Philadelphia.

THE USE OF ILIAC BONE IN THE REPAIR OF FACIAL AND CRANIAL DEFECTS. R. O. DINGMAN, Plast. & Reconstruct. Surg. **6**:179 (Sept.) 1950.

Dingman reviews the history of reconstructive surgery in reference to the ideal substitute for bone in reconstruction of defects in the face and skull. He presents excellent illustrations and photographs in which he shows the removal of portions of the ilium for repair of facial and cranial bony defects. He discusses the fixation of bone grafts. In some instances the grafts fit the recipient areas so accurately that they need no fixation other than accurate replacement of the overlying soft tissues. The author's summary follows:

"1. An ideal substitute for bone has yet to be discovered.

"2. Fresh autogenous bone is the material of choice for the correction of bony deformities of the face and skull.

"3. The ilium provides an excellent source of abundant material for the correction of facial and cranial bone defects.

"4. Patterns of the defect are useful in the preparation of bone grafts.

"5. A method for fixation of nasal bone grafts is described."

SELTZER, Philadelphia.

CARVED CANCELLOUS BONE GRAFTS IN RHINOPLASTY. J. GERRIE, G. E. CLOUTIER and F. M. WOOLHOUSE, Plast. & Reconstruct. Surg. **6**:196 (Sept.) 1950.

A review of various grafts is given by the authors. They describe a pattern of grafts to be carved for cancerous bone and utilized as columellar struts. Their summary and conclusions were:

"1. 73 cases of rhinoplasty are presented in which carved cancellous bone from the iliac crest has been the material of reconstruction. 2. Grafts of "strut" and "keel" types have been placed. 3. To clinical observation these grafts live, and establish a cortex within six months. 4. They are durable, permanent, and to our knowledge only one has geen removed and this from an unsuitable avascular tubed pedicle bed. 5. Complications of the iliac crest donor site have been negligible."

Excellent illustrations and photographs are presented.

SELTZER, Philadelphia.

CANCER OF THE CENTER FACE. J. B. HOWELL, South. M. J. **43**:283 (April) 1950.

Howell presents a group of cases to illustrate the success of treating cancers of the nose; even when the lesion is advanced, he has been able to achieve good results by using low-intensity radium needle interstitially. The advantage of his method is that an extensive lesion of the nose can be treated in this way without causing chondritis or cartilage necrosis. The result is good from a cosmetic standpoint. Extensions are less apt to occur, since the required dose extends at least 0.5 cm. in all directions outside the needles. The technique for needling is given as applied to the nose, the skin of the face and the inner canthus of the eye. The illustrations are excellent, and the discussion at the end of the paper should be read carefully. The warning is included that other tissues may be affected by the irradiation.

SELTZER, Philadelphia.

DECOMPRESSION OF THE FACIAL NERVE. J. TERRACOL and Y. GUERRIER, Rev. laryng. **70**:385 (Sept.) 1949.

The authors report on two patients successfully operated on by the technique of Ballance and Duel. The first patient, a man 44 years old, had a spontaneous palsy of the right side of his face for four months, with degeneration reaction (shown by galvanic current). Three months later only a slight palsy of the lower facial muscles persisted. The second patient, a man 30 years old, had a palsy of the right side of his face consecutive to petrous bone fracture for three weeks. Six months later all the facial muscles were functioning normally. In both cases the taste sense was intact prior to surgery.

HERSON, Chicago.

HEADACHES FROM THE NEUROLOGICAL STANDPOINT. MARIO CONTRERAS V., Rev. otorrinolaring. **10**:18 (March) 1950.

Causes of some of the commoner types of headaches encountered by neurosurgeons are stated by Contreras to be (1) cranial or intracranial tumors, (2) arthropathies of the cervical vertebrae, (3) neuromas of Arnold's nerve or other sensitive nerves of the scalp, (4) headaches associated with lumbar punctures, (5) trigeminal neuralgia, (6) cranial trauma and (7) vascular accidents, particularly subarachnoid hemorrhage. The differential diagnosis in many cases is extremely difficult. However, Contreras has attempted to give the symptoms and the findings in each of the above mentioned groups. Treatment depends on the etiology. Surgery is indicated for intracranial tumors, and x-ray therapy for either trigeminal or cervical neuralgias. For some cases of the latter, he also suggests histaminic desensitization and procaine injection. In conclusion, he stresses the importance of a careful history but states that, in spite of the most exacting studies, many of his patients fail to exhibit any clearcut cause for the symptoms.

PERSKY, Philadelphia.

EVALUATION OF CROWE'S METHOD. G. CAMBRELIN, Acta oto-rhino-laryng. belg. **3**:507, 1949.

While irradiating the nasopharyngeal lymphoid tissue of adults according to the method used in this country (50 mg. radium applicator for 12½ minutes), Cambrelin reduces the dose in children to the following: first treatment, 1 minute 5 seconds; second treatment one week later, 2 minutes 10 seconds, and third treatment two weeks later, 3 minutes 15 seconds. These doses are claimed to be sufficient to obtain reduction of the lymphoid tissue in children. A 50 mg. applicator is used.

HERSON, Chicago.

On Experimentally Induced Tuberculous Meningitis. Svante Bursell, Acta oto-laryng. **38**:34 (Feb.) 1950.

A series of rabbits were inoculated with a bovine strain of tubercle bacilli which were known to be pathogenic to them. The inoculation was done by a suboccipital puncture technique using the method of Martin. Two of the group died within a week's time. These were inoculated with 1,000,000 bacilli.

In another group, inoculation was done with about 240,000 bacilli. Of this group characteristic symptoms and signs of tuberculous meningitis developed in 19 rabbits. It was noted that the meningitis healed, and there were no changes in the brain or the meninges demonstrable afterward. Of the group, five lived for more than two years after the procedure. In one of the group tuberculosis was demonstrated in the lungs. As compared with the lungs, the meninges seemed much more resistant to infection.

Robert Lewy, Chicago.

Removal of Foreign Body from Esophagus by External Approach. Ryuichi Matsuda, Jap. J. Otolaryng. **22**:277 (July) 1950.

Matsuda reports the case of a farmer, aged 64, who accidentally swallowed a full upper denture. The denture was found lodged in the esophagus about 23 cm. below the edge of the upper incisor teeth. Under usual circumstances a foreign body of similar size would not proceed beyond the lower bands of the pharynx or the beginning of the esophagus, but in this case previous unsuccessful attempts at removal had driven the denture farther into the esophagus. Because of the hooklike projection on either side of the denture, the ends of which were found to be firmly inserted into the wall of the esophagus in vertical alinement, an endoscope was wholly inadequate in removing the denture. The denture was finally removed when it was exposed through an external approach to the esophagus and broken into several pieces by aid of dental instruments.

Hara, Los Angeles.

Radium Treatment in Cancer of Root of Tongue. Ichiro Nakagawa, Jap. J. Otolaryng. **22**:285 (July) 1950.

Sato presents seven cases of cancer of the root of the tongue in which by the use of radium and radon seeds favorable results were obtained. The patients, five of whom were men, were all advanced in age. The tumors ranged in size from that of a walnut to that of a hen's egg, and in all cases lymph nodes in the immediate vicinity of the tumor were involved and palpable. Microscopically the growths were seen to be epitheliomas. Metastasis to other parts of the body was found in four cases.

Two patients have been under observation for one year following treatment, two for six months and two for four months. So far no recurrence of cancer has been detected. One patient died from pneumonia five months after being treated.

Hara, Los Angeles.

Correspondence

THE TYMPANIC PLEXUS—AN ANATOMIC STUDY

To the Editor:—There appeared in the July 1950 issue of the ARCHIVES OF OTOLARYNGOLOGY my article "The Tympanic Plexus—An Anatomic Study." In this article were two schematic drawings illustrating the distribution of the tympanic plexus. These drawings were copied, with slight modification, from Dr. O. Marcondes Calasans' exhaustive paper, which on my request he sent me in March 1949. The following reference to his work should have appeared on the legend of figure 1:

"The two schematic drawings are those of O. Calasans, slightly modified. My observations corroborate his. (From *Rev. brasil. oto-rino-Laring.* **10**:611 [Nov.-Dec.] 1942.)"

Somehow, through error or oversight, this reference to Dr. Calasans' work did not appear in the published article. For this regrettable circumstance I apologize to Dr. Calasans.

March 6, 1951.

SAMUEL ROSEN, M.D., NEW YORK.

News and Comment

HOME STUDY COURSES

The 1951-1952 Home Study Courses in the basic sciences related to ophthalmology and otolaryngology, offered as a part of the educational program of the American Academy of Ophthalmology and Otolaryngology, will begin on September 1 and continue for a period of 10 months. Registrations must be completed before August 15. Detailed information and application forms may be secured from Dr. William L. Benedict, the executive secretary-treasurer of the Academy, 100 First Avenue Building, Rochester, Minn.

GRANTS-IN-AID IN AUDIOLOGY

The Audiology Foundation believes that it can best serve the future interest of the science of audiology by encouraging and supporting the adequate training of students.

To this end, the foundation will again, this year, be able to offer a limited number of grants-in-aid to students entering or already engaged in any branch of audiology, including otology, audiometry, speech, acoustics and education of the deaf or hard of hearing. These grants-in-aid will pay $500.00 a year and will be granted on the recommendation of professional teachers in audiology centers.

For further information in regard to these grants please write: The Audiology Foundation, 1104 South Wabash Avenue, Chicago 5.

SUPPLEMENTARY EDITION OF MOTION PICTURE REVIEWS NOW AVAILABLE

The Committee on Medical Motion Pictures of the American Medical Association has completed the first supplement to the second revised edition of the booklet entitled "Reviews of Medical Motion Pictures." This supplement contains 86 reviews of medical and health films reviewed in *The Journal of the American Medical Association* from Dec. 31, 1949 to Jan. 1, 1951. Each film has been indexed according to subject matter. The purpose of these reviews is to provide a brief description and an evaluation of motion pictures which are available to the medical profession.

Copies of this supplement are available upon request to:

The Committee on Medical Motion Pictures
American Medical Association
535 North Dearborn Street
Chicago 10, Ill.

Directory of Otolaryngological Societies *

INTERNATIONAL

PAN AMERICAN ASSOCIATION OF OTO-RHINO-LARYNGOLOGY AND BRONCHO-ESOPHAGOLOGY

Meeting: Third Pan-American Congress of Oto-Rhino-Laryngology and Broncho-Esophagology
Place: Habana, Cuba. Time: January, 1952.
President: Dr. Jose Gros. Information may be secured from Dr. Chevalier L. Jackson, 3401 N. Broad St., Philadelphia 40.

SECOND LATIN AMERICAN CONGRESS OF OTORHINOLARYNGOLOGY AND BRONCHOESOPHAGOLOGY

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Place: São Paulo, Bazil. Time: July, 1951.

NATIONAL

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Secretary: Dr. Louis H. Clerf, 128 So. 10th St., Philadelphia 7.
Place: Toronto, Ont., Canada. Time: May 20 and 21, 1952.

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* Secretaries of societies are requested to furnish the information necessary to keep this list up to date.

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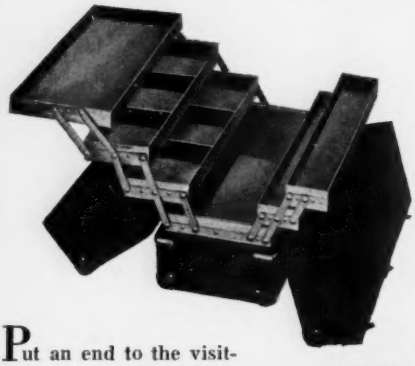

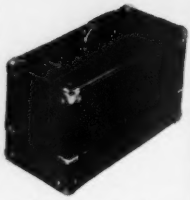

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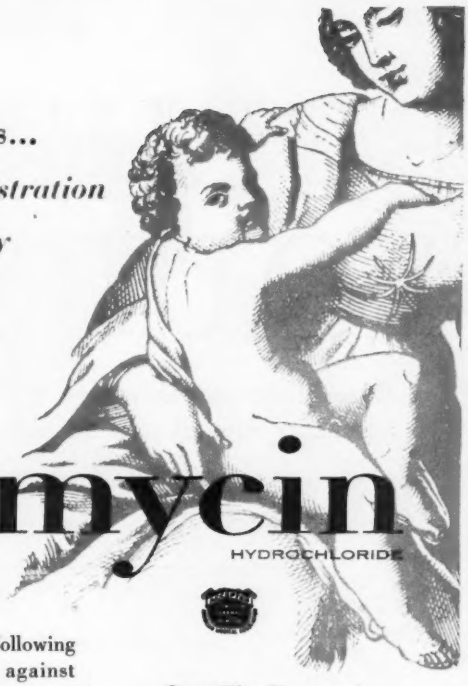
342 Madison Avenue near 43rd St. New York 17, N. Y. MUrray Hill 2-6423

Chartered by the New York State Board of Regents

In the selection
of an antibiotic
for pediatric patients...
effective oral administration
wide range of activity
and low toxicity
are decisive factors*



CRYSTALLINE

Terramycin

HYDROCHLORIDE

Terramycin is rapidly absorbed following oral administration, effective against organisms of the bacterial and rickettsial as well as several protozoan groups, and free of serious side-reactions.

In a recent study encompassing 62 pediatric cases, Terramycin, given by mouth, proved an effective therapeutic agent against respiratory infections due to D. pneumoniae, Staph. aureus, H. influenzae, and beta hemolytic streptococci. Prompt, favorable response was noted in lobar pneumonia, bronchopneumonia, otitis media, tonsillitis, sinusitis, and laryngotracheobronchitis. No serious toxic manifestations were noted, and it was concluded that Terramycin satisfies the criteria for selection of an antibiotic in the infections studied.*

Crystalline Terramycin Hydrochloride is available as:

CAPSULES, 250 mg., bottles of 16 and 100; 100 mg., bottles of 25 and 100; 50 mg., bottles of 25 and 100;

ELIXIR (formerly Terrabon), 1.5 Gm. with 1 fl. oz. of diluent;

INTRAVENOUS, 10 cc. vial, 250 mg.; 20 cc. vial, 500 mg.;

OPHTHALMIC OINTMENT, 1 mg. per Gm. ointment; tubes of ⅛ oz.;

OPHTHALMIC SOLUTION, 5 cc. dropper-vials, 25 mg. for preparation of topical solutions.

*Potterfield, T. C., and Starkweather, C. A.: J. Philadelphia General Hospital 2:6 (Jan.) 1951

Antibiotic Divison **Pfizer** CHAS. PFIZER & CO., INC., *Brooklyn 6, N.Y.*

1941 • A DECADE OF PROGRESS IN ANTIBIOTIC THERAPY • 1951

BELIEVE IN YOURSELF!

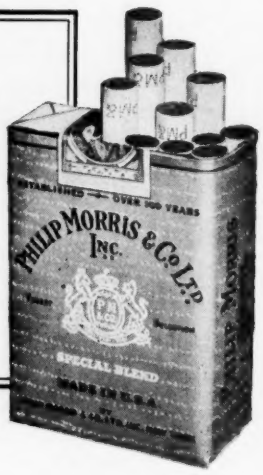
Doctor, you probably have read a great deal of cigarette advertising with all sorts of claims.

So we suggest: make this simple test...

Take a PHILIP MORRIS—and *any* other cigarette. Then,

1. Light up either one. Take a puff—don't inhale—and s-l-o-w-l-y let the smoke come through your nose.

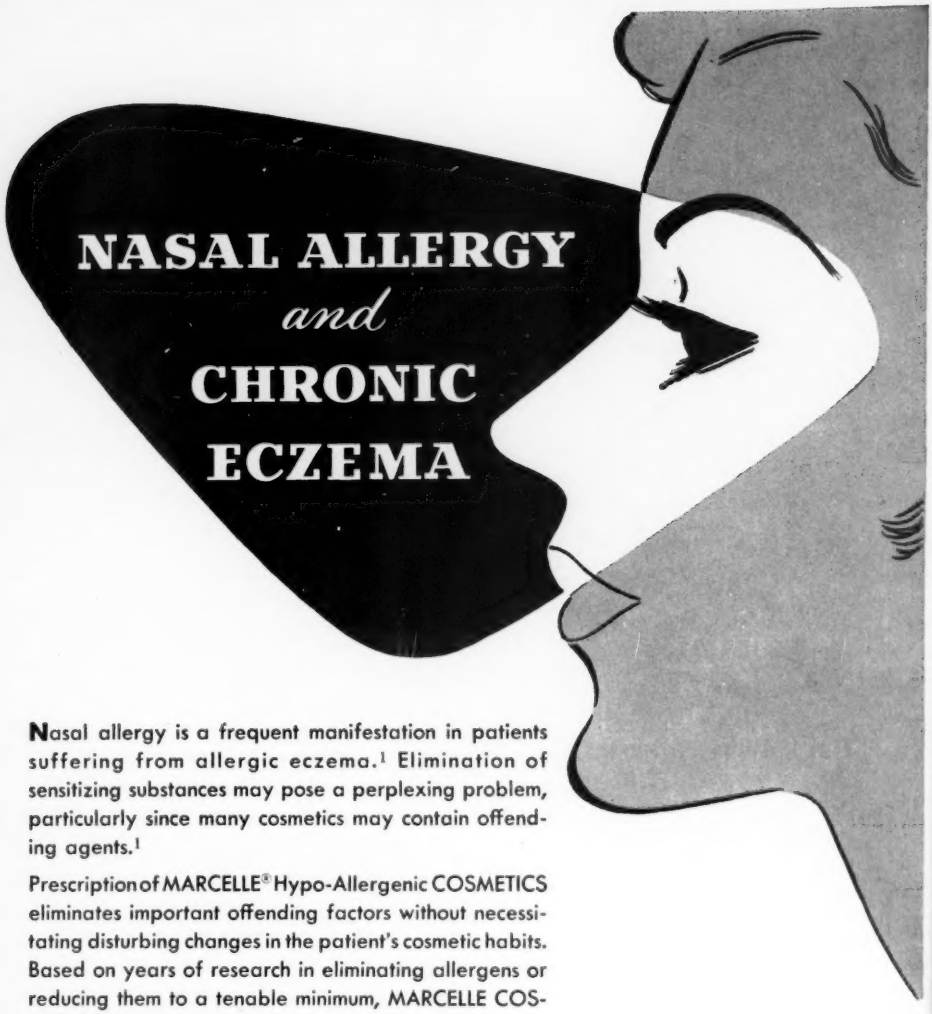
2. Now do exactly the same thing with the other cigarette.



Then, Doctor, BELIEVE IN YOURSELF!

PHILIP MORRIS

Philip Morris & Co. Ltd., Inc.
100 Park Avenue, New York 17, N. Y.



NASAL ALLERGY *and* CHRONIC ECZEMA

Nasal allergy is a frequent manifestation in patients suffering from allergic eczema.[1] Elimination of sensitizing substances may pose a perplexing problem, particularly since many cosmetics may contain offending agents.[1]

Prescription of MARCELLE® Hypo-Allergenic COSMETICS eliminates important offending factors without necessitating disturbing changes in the patient's cosmetic habits. Based on years of research in eliminating allergens or reducing them to a tenable minimum, MARCELLE COSMETICS are valuable aids in the prevention and management of allergic manifestations.

MARCELLE COSMETICS are the original hypo-allergenic cosmetics and the first line of cosmetics accepted by the Committee on Cosmetics of the American Medical Association.

1. Waldbott, G. L.: Management of Allergic Eczema. Am. Pract. 4:59-63 (Oct.), 1949.

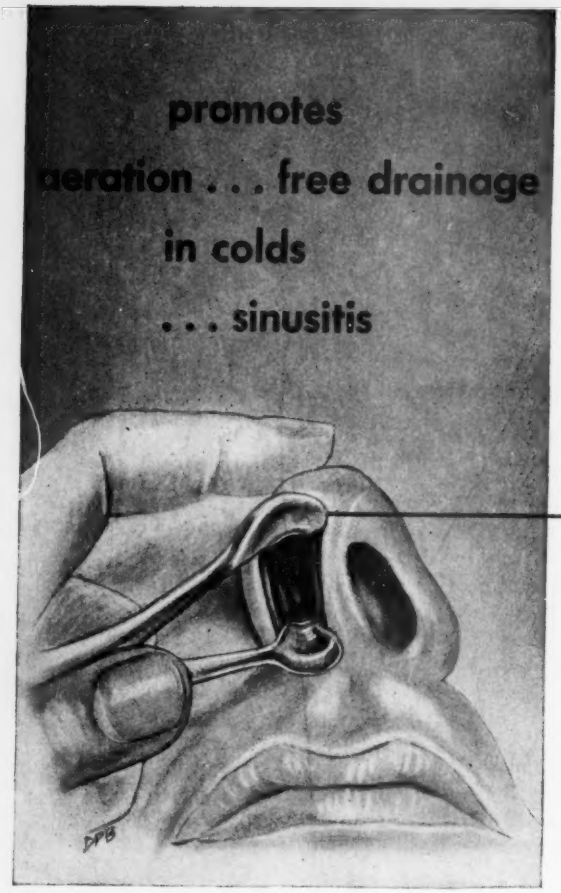
MARCELLE COSMETICS, INC.

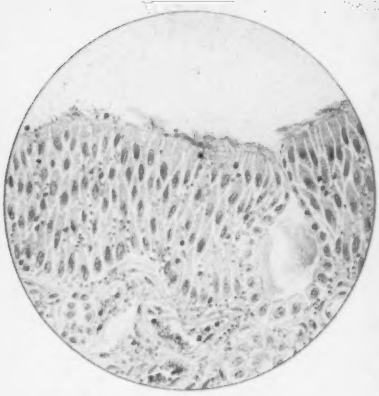
1741 North Western Avenue, Dept. O • Chicago 47, Illinois

Marcelle HYPO-ALLERGENIC COSMETICS

ACCEPTED COMMITTEE ON COSMETICS AMERICAN MEDICAL ASSOCIATION

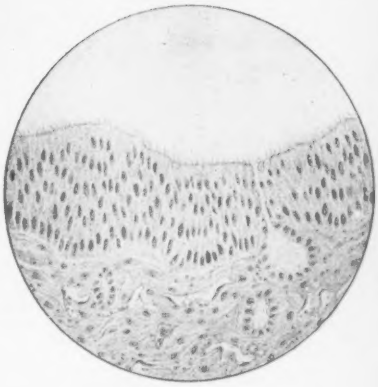
SAFE COSMETICS FOR SENSITIVE AND ALLERGIC SKINS





Nasal membrane showing increased leukocytes with denudation of cilia.

Normal appearing nasal epithelium.



Nasal engorgement and hypersecretion accompanying the common cold and sinusitis are quickly relieved by the vasoconstrictive action of

NEO-SYNEPHRINE®

HYDROCHLORIDE

Brand of Phenylephrine Hydrochloride

The decongestive action of several drops in each nostril usually extends over two to four hours. The effect is undiminished after repeated use.

Relatively nonirritating . . . Virtually no central stimulation.

Supplied in ¼% solution (plain and aromatic), 1 oz. bottles. Also 1% solution (when greater concentration is required), 1 oz. bottles, and ½% water soluble jelly, ⅛ oz. tubes.

Winthrop-Stearns INC.
NEW YORK 13, N. Y. WINDSOR, ONT.

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